INVENTORY OF CONSERVATION RESOURCES

MISSOULA COUNTY, MONTANA

Prepared for the Missoula County Commissioners

AUGUST 1985

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INTRODUCTION

Focus

The following report is an inventory of conservation resources found in Missoula County with a focus on private lands. This inventory was developed as part of a program to supplement non-regulatory forms of land conservation by use of voluntary conservation techniques. This document is not a county plan, nor is it intended to become the basis for any new regulations. Rather, this report is an examination of known public resources and how they relate to the quality of life enjoyed by both visitors and residents of Missoula County.

This study is first and foremost an inventory of what conservation resources exist within the county. The character and distribution of significant natural and cultural resources are described. Clean water, wildlife, open space, recreation, and cultural identity are valued by the people who live here and contribute to the special quality of life found in this portion of western Montana. It is not intended that recognition in this document of the importance of a particular area or landscape feature requires landowners to conserve it, but rather offers owners choices regarding such conservation.

Expected Readership

Although this document was designed for use by Missoula government officials, it is expected the readership will include professionals in areas of expertise such as wildlife, botany, zoology, geology, history and environmental studies. Additionally, it is expected that individual landowners who are interested in voluntary techniques of land conservation will wish to read this material. This report was designed to meet the needs of each of these specialized audiences.

Study Area

Missoula County is located astride an ecologically rich portion of the northern Rocky Mountains (see Map 1). The study area encompasses the entire county, but privately-owned lands are the primary focus (see Map 2). Private lands consist mostly of valley bottoms and foothills which were originally homesteaded. Corporately-owned private lands tend to occupy forested mountainslopes and are interspersed among public lands.

Conservation Categories Addressed in this Inventory

Five categories of conservation resources are addressed in this report: historic resources, open space resources, recreation resources, ecological resources, and agricultural resources. There are many ways in which the broad variety of natural resources could have been considered. However, because the focus of the Missoula Open Space and Agricultural Land Conservation Program is on voluntary, compensating, conservation techniques, categories have been chosen for compatibility with conservation purposes defined in federal law (P.L. 96-541; Tax Treatment Extension Act of 1980) and supported by Montana law (Montana Open Space Land and Voluntary Conservation Easement Act of 1975).

History of this Project

Although there is a substantial amount of public land in the county, many of the conservation resources important to local residents occur on private land. In the past, agriculture and forestry were the dominant land uses. Forest harvest, cattle ranching, and farming activities were not incompatible with the maintenance of the above-described resources. However, during the last twenty years, the land use pattern has changed. The Missoula urban area grew from 58,263 residents in 1970 to 76,016 residents in 1980, an increase of 30%. A population of 96,800 residents has been projected by the year 2000 (27% increase). Extensive land subdivision and residential development in rural areas, as well as rising recreational use pressures, are displacing Missoula County's natural and historic resources.

In 1983, Missoula County planning officials, faced with this and other issues, initiated public involvement aimed at updating the Missoula County Comprehensive Plan. Rural residents expressed a variety of concerns. While many indicated they would like to see open space, recreational lands, and wildlife habitats remain undeveloped, concern was expressed regarding zoning and subdivision regulations which could be used to implement the comprehensive plan. In response, the County Commissioners and Planning Board began to look for alternatives.

In May of 1984, the Missoula Department of Parks and Recreation developed a list of four goals for open space. These goals were:

1) Develop a strategy for conservation of Mount Jumbo using voluntary, compensating means.

2) Work with county officials to identify areas of high environmental, recreational, historical, or open space value.

3) Work with county officials to develop a coordinated approach for identifying and preserving open space.

4) Establish a procedure for the donation of open space land or conservation easements. Missoula land use and conservation planning consultants, Bruce A. Bugbee & Associates, invited by the City to discuss implementation of these goals, was subsequently asked to prepare a proposal outlining how each could be addressed by voluntary methods. The proposal described a two-year program to be funded jointly by the City and County of Missoula.

The first year of the program called for a countywide inventory of conservation resources found on private land, as well as a specific project on Mount Jumbo to protect its open space and recreational values. The second year was to be used to identify conservation opportunities and to train city and county personnel in use of voluntary conservation techniques, such as conservation easements, land exchanges, and partial development approaches. Missoula County Commissioners voted to fund the resource inventory. The City funded the Mount Jumbo project.

Use of this Inventory

Voluntary conservation techniques provide an effective complement to regulatory systems of land use control. In order for programs which utilize voluntary conservation techniques to succeed, conservation priorities must be set. In this inventory areas where public values are concentrated on private lands are defined, and the importance of these values to the public is examined. This inventory is a foundation for the voluntary protection of private lands.

Each chapter in this report is similarly formatted. First, there is a general overview. Second, the geographic distribution of key resources is mapped. Then, significant conservation resources found in each of the eight regions of the county are described. The last chapter of the report provides a composite map and discussion which combines critical resource components and shows their relationship to each other and to subdivision development patterns in the county.

This report incorporates existing resource information and did not develop new data except for the section on open space. Field reconnaissance was minimal except during the open space inventory. Research was systematically conducted to collect and analyze as many studies about Missoula as could be found. That material has been consolidated, and the information in this report represents a previously unprecedented collation of information about the natural values of this area. Individuals were contacted who were considered to be especially knowledgeable about the county's various resources. However, the authors of this report are solely responsible for its contents.

As an inventory of resources, this study's purpose is to assist the County in identification of areas which contain key natural resources and in identification of the type or types of resources recognized by federal and state law as worthy of conservation. Implementation of strategies for such conservation is not within the scope of this inventory. This report illustrates how natural resources relating to recreation, open space, ecology, history, and agriculture are extensively integrated. It becomes apparent the constituency for one of these resources has reason to work with the constituency for others in order to sucessfully accomplish mutually-beneficial resource conservation.

MAP 1

LOCATION
Missoula County, Montana

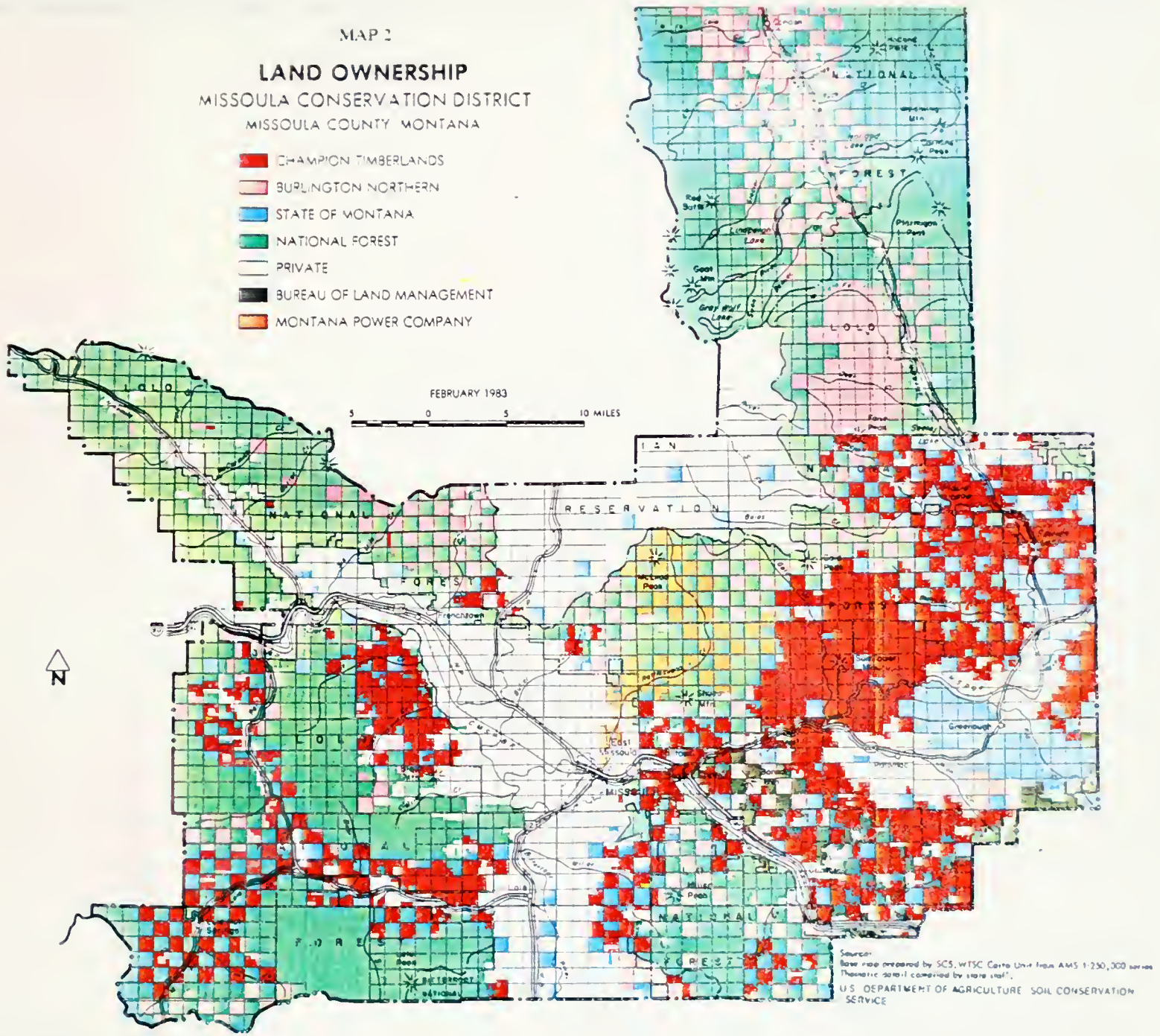
Missoula Open Space and Agricultural Land
Conservation Program 1985

MAP 2

LAND OWNERSHIP

MISSOULA CONSERVATION DISTRICT

MISSOULA COUNTY MONTANA



REGIONAL OVERVIEW

Missoula County encompasses an area of 2,625 square miles, or about 1,700,000 acres. The county's landforms provide the broad framework on which the complex pattern of climate and vegetation is expressed. The present landforms and vegetation of this county are contained within a broad region of the west known as the Rocky Mountain Forest Province—Douglas Fir and Cedar/Hemlock/Douglas Fir Forest Sections (Bailey). This region is typified by rugged, glaciated mountains separated by structural valleys occupied by rivers. Local relief ranges from 3,000 to 7,000 feet.

Vegetation

The Missoula County portion of the Rocky Mountain Forest Province is characterized by well-defined vegetation zones. The uppermost zone in elevation is the alpine zone, characterized by alpine meadows and the absence of trees. Below the alpine is the subalpine zone, dominated in most areas by whitebark pine, subalpine fir, Englemann spruce, and alpine larch. The next lower zone is the montane zone which is characterized by the prevalence of Douglas fir and ponderosa pine in most of the county and by cedar, hemlock, and western larch in the Seeley-Swan region. Within the montane zone, the occurrence of fire favors the development of seral aspen, lodgepole pine, and western larch forests. Below the montane is the foothill zone, a dry area of basin-fill and rocky slopes dominated by shrubs and grasses with areas of open ponderosa pine parklands and pockets of Douglas fir/ponderosa pine forests in moist areas and on north slopes. In drier portions of the region, high altitude grasslands may be bordered directly by the montane zone with forests absent of ponderosa pine. These bunchgrass prairies stand out as inclusions in a forested landscape. River and creek wetlands, which support deciduous cottonwood forests, moisture-loving shrubs, and herbacious vegetation, comprise the floodplain zone.

Climate

The climate of Missoula County, including the amount of precipitation, varies greatly with elevation. Each vegetation zone, from valley bottom to mountain peaks, has a distinct climate. Missoula Valley is semi-arid with only about 13 inches of precipitation annually and a 120-day frost-free period. The Seeley-Swan area receives twice as much precipitation. The high mountains experience 60 inches or more per year, mostly in the form of snow. May and June are usually the wettest months, and July, August, and September the driest. The county is influenced predominantly by Pacific air masses from the west. Occasionally Arctic air intrudes from north. The valleys are generally sheltered from winds, and inversions can develop during winter months. Strong easterly winds occur occasionally when Arctic air spills over the Continental Divide from eastern Montana. Summers are sunny and dry, with highs generally in the upper 80s and lows in the 40s and 50s. However, lows can dip into the 30s at any time throughout the summer. Winters are cloudy in the valleys and cold. January is the coldest month with lows as much as 30 below zero. Snowpack varies from a few inches in Missoula to 12 feet in the high mountains. This snowpack feeds rivers and creeks in the spring, and a late May or early June discharge peak is the norm. Although flooding can occur at this time, ice dam can cause rivers and creeks to leave their channels in winter months, too. Gradual snowmelt, groundwater inflows, and occasional summer showers sustain stream flows and irrigation ditches during the dry summer months.

Wildlife

Missoula County possesses diverse and high-quality wildlife habitat. Large-hooved browsers include elk, mule deer, white-tailed deer, and moose. The county has large deer and elk herds sustained by critical winter range habitats. Big horn sheep and mountain goats find favorable habitats in mountainous terrain. Black bear are found throughout the county. The threatened grizzly bear is found in remote mountains and along rivers and streams of the Evaro and Seeley-Swan regions. Small mammals include beaver, muskrat, otter, mink, skunk, porcupine, weasel, and raccoon, among others. Predators consist of mountain lion, bobcat, lynx, coyote, red fox, wolf, and badger. Raptors include bald and golden eagle, red-tailed hawk, osprey, prairie falcon, turkey vulture, kestrel, several species of owl, and others. Ground squirrels, voles, gophers, mice, rabbits, fish, and small birds form a substantial prey base for these birds. Blue, spruce, and roughed grouse occupy forested terrain and grassland edges. Ring-necked pheasants have been introduced along rivers and are doing well in some places. Sharp-tailed grouse may be found in the upper portions of the Blackfoot River drainage. Sandhill cranes and great blue heron utilize wetlands throughout the county. Waterfowl include Canada geese, trumpeter swan, mallard, pintail, gadwall, teal, widgeon, merganser, and golden-eye. The fishing resource includes rainbow, cutthroat, brown, brook, and other species of trout, as well as mountain whitefish.

The Regions

Eight regions have been recognized within Missoula County, based on settlement, land use pattern, topography, watershed boundaries, and other factors (see Map 3). These regions are Seeley-Swan, Potomac-Greenough, Clinton-Turah, Evaro, Missoula Valley, Lolo, Frenchtown-Huson, and Ninemile. Each region has a distinct character, and its residents possess a specific, local identity.

The large, forested Seeley-Swan region is characterized by a wide valley containing numerous lakes, rivers, and creeks. Seeley Lake is its main community. Private land is not plentiful and tends to be located around lakes and along Route 83. Recreational homes and related activities are co-dominant with forest products and its related activities. Champion International Corporation and Burlington Northern own substantial acreage. The Bob Marshall and Mission Mountain Wilderness Areas border this region to the east and west.

The chief feature of the Potomac-Greenough region is the Blackfoot River. The privately-owned lands within the agricultural valleys at Potomac, Ninemile Prairie (Greenough), and Clearwater Junction are bordered by rolling, forested mountains in mostly corporate ownership. The forest products industry is a key segment of the local economy. Recreational use within the Blackfoot River corridor is intense during summer months. Subdivision and residential development is occurring in the forested, southern edge of the Potomac Valley. Potomac is the region's only community.

The Clinton-Turah region, named for those communities, is centered along the Clark Fork River. This region is primarily a travel corridor, and I-90 bisects it. Non-corporate private land exists as a mile-wide corridor along the river. The Garnet and Sapphire ranges border this region to the north and south, respectively. These mountains are in corporate, state, and federal ownership. Substantial subdivision and residential development activity is taking place.

The lightly-populated Evaro region consists almost entirely of land within the Flathead Indian Reservation. However, the Evaro area itself is not within the reservation. The land pattern is mixed between tribal and non-tribal ownerships. Agricultural land uses are still common. The Jocko River flows through the eastern half of this region, and the Rattlesnake Mountains form its south-easterly border.

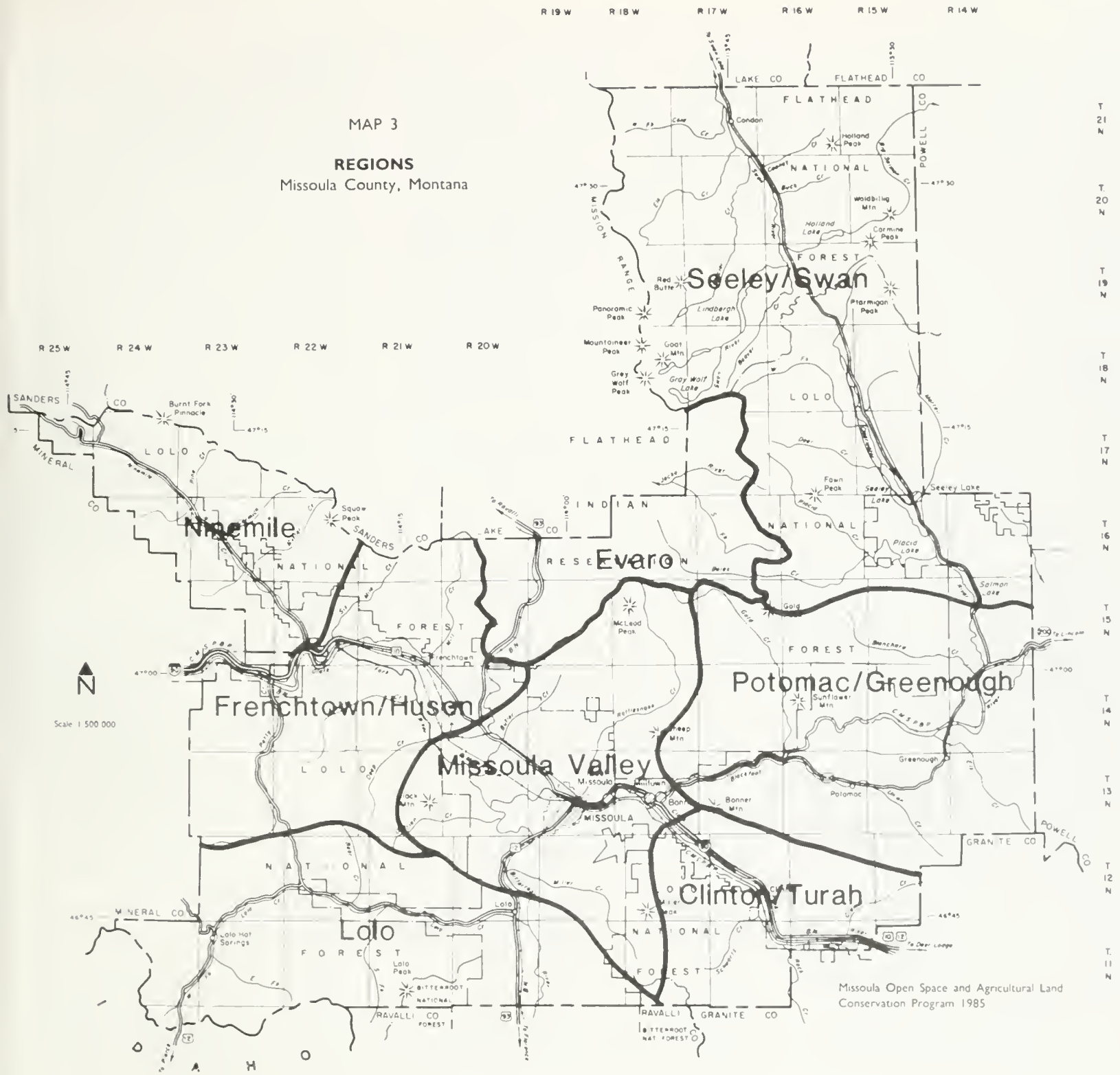
The Missoula Valley region lies at the center of the county and is dominated by the City of Missoula, East Missoula, Bonner, Milltown, and surrounding urban development. The Bitterroot River and numerous creeks flow into the Clark Fork River within this heavily populated area. The Rattlesnake, Garnet, Sapphire, and Bitterroot Ranges rim the valley. This region has the most non-corporate private land of any in the county. Subdivision and residential, commercial, and industrial development outside city limits are significant features. Rattlesnake, Grant, and Miller Creek valleys contain stringers of development radiating from the urban core.

The Lolo region contains the Bitterroot River, Lolo Creek, and their adjacent valleys. Lolo and the surrounding area has grown tremendously in the last decade. The Lolo Creek area contains some non-

MAP 3

REGIONS

Missoula County, Montana



corporate private land between Grave Creek and Lolo. Champion International Corporation and Burlington-Northern owns substantial acreage in the mountains above the creek in a checkerboard pattern with Forest Service lands. The Bitterroot Valley is a broad, structural feature bordered by the Bitterroot Range on the west and the Sapphire Mountains on the east. The valley bottom and basin-fill bedrock benches are in private ownership, and the mountains are in federal and corporate hands.

The Frenchtown-Huson region contains the Clark Fork Valley from Harper's Bridge west to the county line. Agricultural use and residential development are mixed throughout the valley. Champion International pulp mill is the largest employer. Frenchtown and Huson are the local communities. The mountains are mostly in corporate and federal ownership.

The Ninemile region extends from Single Pass along Ninemile Creek to its confluence with the Clark Fork River. The region is bordered by Reservation Divide to the north and Ninemile Divide to the south. A narrow strip of private agricultural land exists in the valley bottom from Pine Creek to the Clark Fork River. The mountains are in Forest Service ownership. The Ninemile Ranger Station and Ninemile Store are community focal points in this rural region. Subdivision and residential development is beginning to occur.

Cultural Legacy

The history of Missoula County has had a lasting impact on the economy of today's residents. Indians, explorers, trapper, miners, loggers, and farmers and ranchers shaped the county's cultural legacy. The present land ownership pattern began when homesteaders, railroad, and mining companies first came to the state. Farmers and ranchers chose irrigable and sub-irrigated valley lands in proximity to water, or they chose areas suitable for dryland cropping or range. Railroad land grants covered similar areas, as well as adjacent forested slopes in checkerboard ownership with public land. Mountainous terrain generally has remained in public ownership. However, large corporate interests own significant amounts of forested mountainslopes. The early economy of the county was firmly based in agriculture, mining, and the timber industry.

Today, only the timber industry and agriculture have maintained their importance. The character of the county has changed dramatically over the years. While, technically, agriculture is still the predominant land use, it accounts for less than 1% of total earnings in the county (*Missoula County Agricultural Protection Study*). Tremendous growth has taken place in non-farm activities. The current economy of Missoula County is based on the wood products industry, government, the University of Montana, wholesale/retail trade, recreation/tourism, and manufacturing.

Great diversity of historic and archeological resources is found on private land in Missoula County. These resources include paleo-Indian and Native American artifacts, occupation sites, and trails, as well as historic structures and land areas associated with settlement which began in 1805 with the Lewis and Clark expedition.

The National Register of Historic Places' inventory was extensively used to provide information in this section. Some resources are described and mapped in detail, while others are mentioned only in general terms. Rural historic buildings and sites are located on Map 4. Urban structures, since they are more well-known, are not. Archeological sites are not mapped due to the sensitive problem of unauthorized "digs" by the public. However, references are made to artifacts in sites which exist countywide. Areas along major rivers, creeks, and lakes are believed to harbor some 95% of all cultural resources in the county. Specific cultural resource data for a particular property is available to the Office of Community Development by requesting a file search from the State Historic Preservation Office, Lolo National Forest, UM library, or UM Department of Anthropology in the event of a proposal for development or conservation project.

Historic Overview

The human story began long ago in Africa, and later spread to Europe and Asia. Many of us come from ancestors of those who wandered to Europe, but the first to enter Montana and the Missoula area came by way of Asia.

Some 12,000 years ago, near the end of the last Ice Age, much of the earth's water was frozen in glacial ice. This resulted in a lower sea level and the creation of a land bridge between present-day Alaska and Siberia. It is believed the first humans entered North America by foot across this now-submerged land mass. These hunter-gatherers followed herds of caribou, wooly mammoth, camel, and giant bison through an ice-free corridor into Montana, the Missoula area, and beyond.

The first Indian artifacts found in the county are of the paleolithic period and come from the Clearwater Junction area. These are "Clovis" spear points, some 12,000 years old. Massive Glacial Lake Missoula filled most of the valleys within the county until about 10,000 years ago. Once the lake drained, these early Indians were able to hunt and gather food in these low-lying areas. For thousands of years, small groups moved around the landscape leaving behind the most lasting evidence of their presence—scattered projectile points.

The first known semi-permanent occupation sites developed about 5,500 years ago. This "Plains Archaic" period was marked by strong influence on local bands by the cultures of the Columbia Plateau and Snake River areas. There was an increased use of plant food and fibers. What is now the Lolo Trail may have been used during this time as a migratory and trading route.

During the following centuries, Missoula County was occupied by a succession of Native American tribes. In the 1500s, Spanish explorers unintentionally introduced the horse to Indians in the New Mexico area. Horses were traded throughout the west, and the resulting mobility caused considerable shifts in the already loose system of tribal territories. In the 1600s, Europeans settled the East Coast of the United States. This initiated a chain reaction of conflicts in tribal relocations westward. Colonization and the introduction of the horse sent shockwaves through the Montana tribal landscape. The results proved dramatic. By 1700, the Flathead, Pend Oreille, and Kootenai had been pushed from the Great Plains into western Montana by the Blackfeet and other tribes. Occasional trade with European trappers during this period provided the first contact between Indian and white cultures. Horses allowed the Flatheads greater hunting success and initiated seasonal trips to eastern Montana to kill bison and west to harvest salmon for winter larders. The Lolo Trail was used by Nez Perce, Flathead, and other tribes as a major travel route. Flathead Lake was a cultural center and meeting place for nearly all western Montana tribes. At the time of white settlement, the Missoula County area was used by Flathead, Kootenai, Pend Oreille, Blackfeet, Nez Perce, and Shoshone tribes.

The evidence for the long-standing presence of various Indian cultures in Missoula County comes from a wide array of artifacts and sites. The culture of Stone-Age people has been transmitted to us through flake knives, scrapers, spear and arrow points, awls, mauls, and pipes. They worked in black obsidian (from the Yellowstone and Snake River areas), brown basalt, red jasper, white silicate, green mudstone, and various hues of chert, flint, and quartzite. Pictographs of animals and hunters adorn bedrock walls. Stone cairns, scarred trees, and bent marker trees defined ridgeline trails. Rock shelters on mountaintops provided places out of the wind and may have served ceremonial purposes. Tipi rings and hearths tell of occupation sites. Rock quarries, chipping sites, tool manufacturing sites, look-out trees, and piles of bison bones provide further details of how Native Americans lived on this landscape.

River and creek corridors and hot and cold springs are the areas in which 95% of archaeological and cultural artifacts have been found. Flat terraces, lake outlets, and streams' confluences appear to have been favored for camping, much as they are today. Low terraces were occupied during fall and winter, due to cottonwood forests which provided a source of firewood near water and offered protection from cold winds. Spring and summer camps were made on windier, higher terraces in order to escape mosquitos. Because arrow-

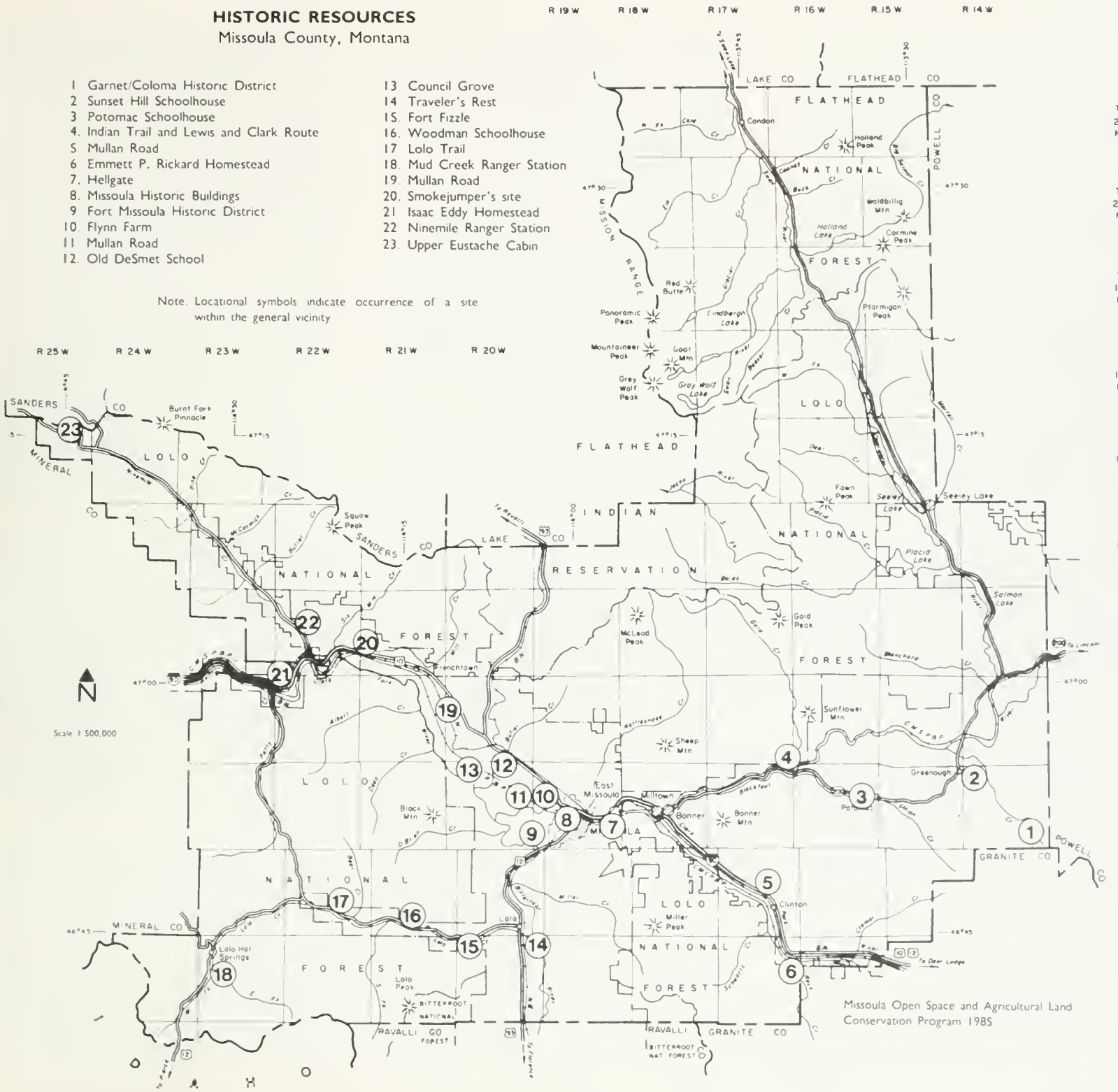
MAP 4

HISTORIC RESOURCES

Missoula County, Montana

1. Garnet/Coloma Historic District
2. Sunset Hill Schoolhouse
3. Potomac Schoolhouse
4. Indian Trail and Lewis and Clark Route
5. Mullan Road
6. Emmett P. Rickard Homestead
7. Hellgate
8. Missoula Historic Buildings
9. Fort Missoula Historic District
10. Flynn Farm
11. Mullan Road
12. Old DeSmet School
13. Council Grove
14. Traveler's Rest
15. Fort Fizzle
16. Woodman Schoolhouse
17. Lolo Trail
18. Mud Creek Ranger Station
19. Mullan Road
20. Smokejumper's site
21. Isaac Eddy Homestead
22. Ninemile Ranger Station
23. Upper Eustache Cabin

Note. Locational symbols indicate occurrence of a site within the general vicinity



Missoula Open Space and Agricultural Land Conservation Program 1985

heads or other artifacts may be found on terraces beside nearly every river, large creek, and lake in the county, the mere presence of a projectile point or other feature is not evidence of a significant archaeological find. However, many sites in the county have had their archaeological importance confirmed and recorded. The presence of a known archaeological site may be a determinant in public protection or aid in prioritizing a property for conservation.

In 1805, the Lewis and Clark expedition was sent by President Thomas Jefferson to explore the territory contained in the Louisiana Purchase. Present-day Missoula County was included in that massive area which encompassed some of the least-charted wilderness on the continent. In the fall of 1805, the expedition entered the Bitterroot Valley and camped for three days near Lolo Creek at a site they called Traveller's Rest. Indian guides then led the explorers over Lolo Pass and eventually on to the Pacific Ocean. On their return trip east to St. Louis, Lewis and Clark again traversed the Lolo Trail and reached Traveller's Rest on June 30, 1806. On July 3, the expedition separated in order to explore more terrain. Clark and his party made their way up the Bitterroot and eventually reached the Yellowstone county. Lewis took a smaller party and passed through the Missoula Valley, crossed the Clark Fork River at Rattlesnake Creek, moved through Hellgate Canyon, and proceeded up the well-known "Trail to the Buffalo" along the Blackfoot River.

English and French explorers, traders, and trappers moved through the county during the next decades. A trapper named David Thompson who worked for the Northwest Company is generally credited with naming Missoula, based on a collection of Indian references to the area. "Missoula" roughly means "at the water of surprise," referring to numerous Indian ambushes which took place in what French trappers called "Porte d'Enfer" or Hell's Gate.

In 1841, a Jesuit priest, Father DeSmet, arrived in Missoula Valley to work with the Flatheads. Many Indians had been converted to Catholicism years before by a French priest named Ignace LaMoussee. Father DeSmet established St. Mary's mission in the Bitteroot Valley near Stevensville. This mission would become a private trading post known as Fort Owen, until purchased back by the "Blackrobes" in 1866. Still later, a grander St. Mary's mission would be built at St. Ignatius in the present Flathead Reservation. The DeSmet School (1895) was named for Father DeSmet.

By the 1850s, more whites were moving west in search of fortune in the gold fields of California, Colorado, and Oregon. Some stayed to farm and ranch. In 1853, Isaac Stevens was appointed territorial governor of Washington, which then included Montana. Because confrontations were increasing between Indians and whites, Stevens saw the Indian presence as an obstacle for transcontinental roads and railroad lines. On July 9, 1855, Stevens met with Flathead, Kootenai, and Pend Oreille chiefs. The site for this gathering was Council Grove, a favorite meeting place of the Indians, located west of Missoula on the Clark Fork River. The resulting treaty established the Flathead Reservation in the Mission Valley where the three tribes would live together as the Flathead Nation, but the last Flatheads under Chief Charlo did not leave the Bitterroot Valley until 1890.

In 1859, Army Lieutenant John Mullan was placed in charge of surveying and constructing a 425-mile military road from Fort Benton to Fort Walla Walla. The road was to facilitate troop movement between the head of navigation on the Missouri River and the Columbia Plateau during "the Indian Wars." This travel corridor, negotiated as part of the Stevens Treaty, was completed in 1862 and followed the Clark Fork River through the breadth of Missoula County. Although never used for military purposes, the road was traveled by some 20,000 people during the gold rushes of the 1860s.

The 1862 Homestead Act fostered the development of many ranches in Missoula County. In 1861, Francis Worden, C.P. Higgins, and Frank Woody opened a general store in Hellgate Canyon. The Higgins and Wordens store was built with timbers provided by David Pattee. It was the first structure ever built in Missoula County. More would follow.

Gold soon changed many things. Strikes at Bannack, Virginia City, Alder Gulch, Marysville, Helena, and Granite brought thousands of people up the Missouri to Fort Benton. Some prospectors followed the Mullan Road to Missoula County. Gold was soon discovered at Garnet-Coloma, Elk Creek, Ninemile, Lolo Creek, and other areas. The productive Garnet-Coloma district contained a series of strikes which caused a sequence of short-lived towns to spring up and die out.

In response to increased mining and population growth, C.P. Higgins, Frank Worden, and David Pattee formed the Missoula Mills Company. A sawmill was built next to the Clark Fork about four miles downstream from the Hellgate Store. This development marked the birth of what we now call Missoula.

During the summer of 1877, Fort Missoula was built by the U.S. Army. This military installation was one of eleven constructed in Montana between 1866 and 1892. Included in "the Fort's" history are noteworthy periods such as the 25th Negro Infantry Regiment (1888), Civilian Conservation Corps (1933-1940), World War II Prison Camp (1941-1947), and the present use of the area as a recreation center. However, the most famous episode associated with the Fort took place in the summer of 1877, during the first year of its existence.

Word reached Missoula that Chief Joseph and Chief Looking Glass were leading a large band of non-reservation Nez Perce east across the Lolo Trail. The Indians were moving to the camas digging grounds of the Big Hole Valley and then on to the bison herds of eastern Montana. On July 25, Captain Rawn led five officers, 30 enlisted men, and about 100 citizen volunteers to a site some five miles up Lolo Creek. Trenches and earth breastworks were built for protection. The Nez Perce arrived and camped to the northwest. A conference was held between Captain Rawn and the Nez Perce chiefs. The chiefs wanted only peaceful passage through the Bitterroot Valley, as they and their ancestors had made for hundreds of years. Rawn said he would grant permission only if the Indians surrendered all their weapons and ammunition. The chiefs did not agree to these terms. The citizen volunteers, after hearing the Nez Perce were peaceful, left Rawn and returned to their ranches and homes. At dusk on July 28, Chief Joseph and the Nez Perce ascended a ridge to the south and simply skirted the calvary, who were dug-in at what is now called Fort Fizzle. Later, the U.S. Calvary, under Colonel Gibbon, chased the Indians to the Big Hole and attacked. This site is now recognized as the Big Hole National Battlefield. Chief Joseph's band escaped after taking heavy losses, only to be caught that winter, some 30 miles south of the Canadian border. It was then that Joseph said, "I will fight no more forever" and surrendered.

Ranching, farming, logging, and commercial business increased markedly in Missoula County during the late 1800s and early 1900s. The coming of the Northern Pacific Railroad to Missoula in 1883 caused an economic boom. Dozens of sawmills existed to supply lumber for the railroad and the growing town. Mining operations continued in the mountains. More homesteaders spread out over all portions of the county, lured by the prospect of owning their own land, creating an independent existence, and perhaps achieving substantial wealth. In the early 1900s, a land speculation scheme in the Bitterroot Valley caused thousands of acres to be subdivided into "Apple Orchard" tracts, which were sold at unheard of prices of up to $1,000 per acre. This land boom soon went bust. However, huge areas remain subdivided.

Missoula experienced relative economic prosperity and a tremendous building expansion from the 1890s through 1915. As the county seat and regional commercial center, the city soon had banks, a courthouse, a university, a library, churches, blocks of retail stores, and numerous hotels. The Forest Service was formed in 1905, and Missoula became an administrative center. The coming of the Milwaukee Railroad in 1910 strengthened the city's economy further. Prosperous businessmen built fine homes. By 1915, most of Missoula's familiar landmark buildings had been constructed, and the city had taken on much of its modern aspect. Private rural

land remained in agricultural use. The forested mountains were managed by the Forest Service and various private corporations. The economy then, as it is now, was based on the wood products industry, government, and retailing.

The 1960s marked the beginning of the most significant change in the county's landscape during its 12,000 years of human occupation. Rural lands, once the domain of ranches, farms, and small settlements, began to be subdivided and developed for non-farm purposes. As a result, wildlife habitat, open space, recreational opportunities, historic features, and agricultural enterprises began to disappear.

The following information provides details of historic and cultural resources found in each of the county's eight regions. Information includes sites and structures on or officially eligible for the National Register of Historic Places (NRHP), sites and structures locally recognized as significant, and summaries of archaeological features. Land areas adjacent to significant properties which contribute to their historic or cultural integrity may also have public value.

Seeley-Swan

An Indian trail east to the buffalo herds once ran from the Jocko Valley down Finley Creek to Placid Lake and then on to the Blackfoot River. Occupation sites and rock tool manufacture sites exist around many lakes within this region.

Sites and Structures on NRHP: None

Sites and Structures Eligible for NRHP: None officially recognized

Potomoc-Greenough

Indian occupation sites and artifacts are common along the Blackfoot River. The most ancient artifacts (12,000 years old) found in the county have been discovered near Clearwater Junction. Going-to-the-Buffalo Trail, used by the Indians, paralleled the Blackfoot River and was traversed by Merriwether Lewis in 1806. The mining camps and towns of the Garnet, Coloma, and Yreka districts are still partially intact. Numerous buildings, railroad grades, and stamp mills remain from the mining era. Garnet is a ghost town preserved by efforts of the Bureau of Land Management and is popular with recreationists year-round. The history of the Blackfoot River Valley encompasses trapping, homesteading, and logging activities of the Anaconda Company and others.

Sites and Structures on the NRHP: None

Sites Eligible for NRHP: None officially recognized

Other Signficant Sites and Structures: The Potomac and Sunset Hill (Greenough) Schoolhouses are historic buildings whose importance awaits evaluation.

Clinton-Turah

Indian artifacts are found on the terraces along the Clark Fork River. The Mullan Road and two railroad lines run its entire length.

Sites and Structures on the NRHP: None

Sites and Structures Eligible for the NRHP:

The Mullan Road. Much of the route of the Mullan Road is now believed to be followed by I-90 or local frontage roads.

The Emmett P. Rickard Homestead (1911). This early homestead is located on Rock Creek.

Evaro

The Mission Valley and Flathead Lake area was once a cultural trading center for many Native American tribes. Sites and artifacts are common. This region is entirely within the Flathead Indian Reservation.

Sites and Structures on the NRHP: None

Sites and Structures Eligible for NRHP: None officially recognized

Missoula Valley

Much has been written about the history of Missoula and the surrounding valley. References are available in this report's bibliography. Numerous archaeological sites exist in Missoula Valley. Many structures and land areas have achieved various degrees of officially-recognized historical significance.

Sites and Structures on the NRHP:

Flynn Farm. The 1872 homestead of Michael Flynn, an Irish immigrant, located west of Missoula off Mullan Road. A red brick house was built in 1883. It is an example of early Missoula County homesteads. The surrounding area is subdivided with increasing residential development.

St. Francis Xavier Church. This large, Romanesque Revival structure has been a Missoula landmark since 1892, when it was constructed at the corner of Orange and Pine streets.

Higgins Block. This 1899 landmark structure was originally C.P. Higgins' Western Bank Building. It is a fine example of Queen Anne style architecture, due to its varied materials such as stone, brick, terra cotta and metal. It is currently the First Federal Savings Building and was rehabilitated in 1983 with street-level shops and second- and third-story offices.

Grand Pacific Hotel. This large hotel was built in 1902, across Railroad Street from the Northern Pacific (BN) Railroad Line. Rehabilitated in 1984 for apartments, and now called Park Place, it is located at 118 West Alder.

Carnegie Public Library. This small, Neo-Classical masonry structure built in 1903 is now the Missoula Museum of the Arts and located at 335 North Pattee Street.

John R. Toole House. Home of a Missoula businessman who held a prominant position in the Anaconda Copper Mining Company under Marcus Daly. This well-preserved example of Neo-Classical architecture was built in 1903. It is presently the Kappa Kappa Gamma Sorority House located at 1005 Gerald Avenue.

Missoula County Courthouse. The present Neo-Classical sandstone courthouse was built in 1908 following the plans of Missoula architect, A.J. Gibson. Palace Hotel. This is one of Missoula's early downtown hotels (1909). The bottom floor was renovated recently for a restaurant and other businesses. It is located at 147 West Broadway.

Belmont Hotel. This brick hotel was built near the Northern Pacific (BN) depot in 1909 and was part of early downtown Missoula. In 1982, the Belmont was rehabilitated into apartments. It is located at 430 North Higgins Avenue.

Northern Pacific Railroad Depot. This turn-of-the-century depot presently is being remodeled. For years, it was the Burlington Northern passenger and freight depot.

University Apartments. These turn-of-the-century row apartments are located on Roosevelt Street.

Milwaukee Depot. This 1910 structure was the first and only depot of the Chicago, Milwaukee, and St. Paul Railway in Missoula. The depot was sold to private investors and extensively rehabilitated in 1980. It is now a riverfront restaurant located at 250 Station Drive.

J.M. Keith House. This was the home of an influential businessman and three-time mayor of Missoula. It is now the Sigma Chi Fraternity House located at 1110 Gerald Street.

U.S. Post Office. The basic structure of the present Federal Building was built in 1911 with several subsequent additions. This Italian Renaissance Revival building is located at 200 East Broadway.

Fred T. Sterling House. Constructed in 1912, this Arts-and-Crafts Bungalow-style home was designed by A.J. Gibson and built by a prominant Missoula businessman. It is located at 1310 Gerald Avenue.

John S. Johnston House. This fine Queen Anne-style residence was constructed in 1912. It is located at 412 West Alder.

A.J. Gibson House. This was the home of the noted Missoula architect who designed the County Courthouse, Main Hall, and numerous Missoula mansions. This 1913 renovation of an 1889 structure is located at 402 South Second Street.

The Wilma Theatre. Since its construction in 1921, the stage of this theatre has been graced by the Los Angeles Philharmonic Orchestra, Will Rogers, John Philip Sousa, Ethel Barrymore, Carlos Montoya, Mahalia Jackson, Mark Twain, and many other notable performers. It is also used as a movie theatre.

Forkenbrock Funeral Home. This Colonial Revival structure (1929) is now the Geraghty Funeral Home at 234 East Pine Street.

Sites and Structures Eligible for NRHP:

Miller Creek Site. A scatter of rock paleo-Indian artifacts such as side-notched projectile points, mortar bases, firecracked hearths, and net sinker weights are located at this site in the lower reaches of the Miller Creek drainage basin.

Fort Missoula Historic District. "The Fort" complex, which dates to 1877, includes numerous buildings and grounds. It is likely to be placed on the NRHP by late 1985.

Old DeSmet School. This 1895 building was constructed of brick made from pink Glacial Lake Missoula clays from the nearby airport terrace. This structure was a school and community center for the town of DeSmet, which once existed nearby.

Prescott House. This large, frame house on the University of Montana campus was built by the Prescott family in 1897. The University owns the structure, but Mr. Prescott, Jr., continues to live in the house and to maintain extensive flower gardens.

Miscellaneous Historic Buildings. Several buildings in Missoula have been identified as eligible for the Register as part of a HUD-funded inventory of the City. These structures are located at the following addresses: 432 East Pine; 442 West Spruce; 508 Toole; 501 West Alder; 236, 309, 315 East Spruce; HUD Eastside Residential Historic District; Missoula Hotel, 147 West Main.

Other Significant Sites and Structures:

Lewis and Clark Route. This 1806 route through Missoula of the explorer, Merriwether Lewis, is described in his journals.

Council Grove. This is the site of the 1885 Stevens Treaty with the Flatheads, Kootenai, and Pend Oreille Indians establishing the Flathead Reservation.

Mullan Road. This 1862 military road through Missoula County is now extensively covered by paved roads. It was the first significant effort at surveying and road-building in Montana.

Hellgate. This was a trading center on the Mullan Road during the 1860s and the site of the Higgins-Worden Store, the first-known commercial structure in the Missoula area.

Main Hall. This stone building was erected in 1898 and was the first structure on the University of Montana campus.

Milltown Dam. This dam was built in 1908 to generate power for a rapidly growing Missoula.

E.S. Paxson House. This structure at 611 Stephens was the former home of the well-known Montana artist who painted the murals in the Missoula County Courthouse.

Sacred Heart Academy. A two-story stone structure used as a church-affliated school.

Lolo

The rich history of this region encompasses Indian trails and occupation sites, the route of the Lewis and Clark expedition, mining, logging, and homesteading.

Sites and Structures on the NRHP:

The Lolo Trail. This prehistoric and historic travel route is still visible on the landscape. The route, used by Native Americans and Lewis and Clark, fell into disuse in the late 1800s. The first rough road over Lolo Pass was built by the Civilian Conservation Corps in 1935, and the modern highway was constructed in 1962.

Traveller's Rest. This campsite near Lolo was used by the Lewis and Clark expedition on both legs of their journey west to the Pacific and east to St. Louis (1805-1806).

Fort Fizzle. Rough fortifications used in 1877 by calvary from Fort Missoula in their failed attempt to stop the Nez Perce Indians under Chiefs Joseph and Looking Glass. Breastworks are still slightly visible, and military buckles, spurs, and rifle cartridge cases are occasionally found.

Sites and Structures Eligible for NRHP:

Mud Creek Ranger Station. These are log structures built in 1922 as Forest Service facilities.

Other Significant Sites and Structures:

Woodman Schoolhouse. The frame schoolhouse was built in 1902 to serve the now-vanished town of Woodman. Woodman existed because of homesteading and mines such as the Chickaman and Lawyers Combination.

Frenchtown-Huson

Homesteading and the wood products industry dominate the history of this region. Settling of the area by families of French ancestry accounts for the name of its central community. Archaeological artifacts are found along the Clark Fork River. Pictographs exist on the bedrock walls of Alberton Gorge.

Sites and Structures on the NRHP: None

Sites and Structures Eligible for the NRHP:

Isaac Eddy Ranch. This 1860s homestead has several historic buildings and an intact portion of the Mullan Road.

Other Significant Sites and Structures:

Smokejumpers' Site. The abandoned smokejumpers' site near Huson is historically significant as a Forest Service base of operations during the 1940s.

Mullan Road. This 1862 road traverses the region.

Ninemile

Early Indians quarried rock for points and knives in the mountains of this region. Artifacts and occupation sites also exist, mostly near water. Features related to Forest Service activities and private homesteading characterize the history of this region.

Sites and Structures on the NRHP:

Ninemile Ranger Station. Numerous significant structures exist in this Forest Service facility which originated during the early 1900s. It was known as the "Remount Station" due to horseback duty common to the era.

Sites and Structures Eligible for the NRHP:

Whitetail Archaeological Site. Located on a side drainage of Ninemile Creek, the surface and subsurface contains projectile point fragments, ovoid knives, scrapers, and other ancient artifacts.

Upper Eustache Cabin. This isolated log structure was built in 1918, but is typical of cabins used during the 1860s gold rush.

Recreation is the most extensive non-consumptive human use of the Missoula County landscape. The opportunity to enjoy outdoor recreational experiences is a central component of a desirable quality of life to residents of the county, and a wide variety of recreational amenities is available. Recreation features are attractive to non-residents as well and help support related businesses such as motels, restaurants, sporting good supplies, and outfitting and guide services.

Recreatinn Overview

Missoula County is included in Region II of the Montana Department of Fish, Wildlife and Parks (MDFWP). This relatively small region encompasses Missoula, Mineral, Granite, Ravalli, Powell, and Deer Lodge counties. Despite its size, Region II has among the highest activity levels of any of MDFWP's seven regions.

The Missoula Parks, Recreation, and Open Space Plan, as well as the recreation plans of MDFWP, Forest Service, Bureau of Land Management, and other agencies provide detailed recommendations for recreation use in Missoula County and will not be addressed in this report. While many plans and location-specific studies have been prepared, a comprehensive view of the current recreational needs on public and private lands does not exist. An inter-agency group with members from the Forest Service, MDFWP, BLM, YWCA, Missoula Department of Parks and Recreation, and the Missoula Office of Community Development has recently been formed to address this and other issues. This group's first priority is to identify public needs for recreation, coordinate a five-year recreation opportunity plan, identify any populations which are being omitted from recreational services, and begin long-range forecasting of recreation demands. The group's second priority is to identify how the various agencies can share facilities, expertise, resources, and programs. Other agenda items include a unified map of sites and facilities, consolidation of agency policies, coordination of agency plans, and creation of a central location for public information on recreational opportunities. The analysis of recreation resources contained in this report can provide useful data to the inter-agency group.

Recreation Demand

MDFWP's State-wide Comprehensive Outdoor Recreation Plan indicates Region II, which includes Missoula County, ranks first in recreation activity days for backpacking, bicycling, motorcycling, off-road vehicle use, and snowshoeing. This region ranks second in day hiking, non-urban swimming, and horseback riding on trails. It ranks third in cross-country skiing, snowmobiling, picnicking, and backcountry camping, and fourth in river floating. Recent increases in floating on local rivers may soon elevate this last ranking. Missoula County contains some of Region II's main recreational attractions or access to those attractions. These include the Blackfoot, Bitterroot, and Clark Fork river corridors, the Selway-Bitterroot, Welcome Creek, Bob Marshall, Mission Mountain, and Rattlesnake wilderness areas, the Rattlesnake National Recreation Area, the Seeley-Swan chain of lakes, the Blue Mountain and Pattee Canyon recreation areas, and miles of high quality fisheries.

Hunting and fishing are actively pursued by both residents and non-residents. Pressure is increasing tremendously from out-of-state hunters. In 1983, all the state's non-resident big game combination licenses were sold in 45 days. In 1984, all such licenses were sold in less than 30 days. In 1985, it took only six days to sell all 17,000 non-resident big game combination licenses. Region II absorbs a significant share of this use and other hunting and fishing pressure. In 1983, 56,791 individuals purchased conservation licenses in Region II. These licenses are a pre-requisite for acquiring a fishing or any of the various hunting licenses. Of this total, 16,259 residents and 14,698 non-residents purchased one or more of the various hunting licenses. Some 24,432 residents and 1,402 non-residents acquired fishing licenses only. The number of all licenses is increasing moderately according to MDFWP personnel.

Region II averages about 287,000 fisherman days annually. About one-third of local residents fish. Fishing license sales increase two to three percent per year. Angling pressure is rising, due to population increases, and habitat is being lost due to stream bank alterations, dewatering, and land subdivision and development.

Region II ranks second of all seven MDFWP regions in hunting recreation days for elk, mule deer, moose, and black bear, and is third in hunting activity related to white-tailed deer and mountain goat. Elk provide the greatest attraction to hunters, and therefore, contribute significant economic benefit to the county. The majority of big game hunting takes place on public lands, but substantial numbers of white-tailed deer, upland game birds, and waterfowl are taken on private lands. Significant quantities of big game winter range are privately owned. Winter range is a critical factor in determining the size of herds. Upland game birds and waterfowl also attract signficant hunting activity. Trapping takes place for mink, muskrat, beaver, weasle, bobcat, skunk, coyote, raccoon, badger, fox, Canada lynx, wolverine, and martin. Nearly all species of interest to both recreational hunters and non-hunters depend on private land for some critical phase of their lifecycles.

Most of the land along rivers and major creeks is privately owned. The demand for access across private land to public land and waterways is rising and will be a major issue in future decades. Therefore, all private

lands bordering government ownerships which are managed for recreation can be considered a key resource value. The border along public land appears on Map 5, but for simplicity's sake is not highlighted.

Relations between landowners and hunters, off-road vehicle users, and river users are particularly prone to problems due to high demand and occasional irresponsible recreational use by the public. Landowners elsewhere in Montana are selling long-term hunting leases to private users groups who agree to police the property during hunting season and pay a fee to the landowner for the privilege of using his land. If conflicts continue to result in limited hunting access to private land, public pressure will come to bear on government agencies to manage public lands for recreational purposes rather than for other values such as commercial timber harvest and livestock grazing.

Landowner conflicts with river and lake users are also a significant issue. Irresponsible public use, inadequate facilities, and insufficient number of public sites have caused problems related to garbage disposal, law enforcement, trespass, fires, and destruction of private property. The Montana Legislature passed a law in 1985 which assures public use of rivers between seasonal highwater marks. This law was a compromise designed to meet the needs of both the landowners and recreationists.

Recreational use of Lolo and Flathead National Forest is increasing steadily. The majority of such use is dispersed. In 1983 1,200,000 total recreation visitor days (RVDs) occurred on the Lolo National Forest with a significant share occurring in Missoula County. Of these RVDs, 960,000, or 80%, were used for dispersed activities and 237,000 RVDs, or 20%, occurred at developed Forest Service campgrounds and other facilities. Although a relatively small amount of the Flathead National Forest is located in Missoula County, recreation use patterns are similar. Wilderness use is increasing moderately and contributes about 20% to dispersed activities. The primary conflicts on National Forests are between motorized and non-motorized recreationists such as snowmobilers/cross-country skiers, powerboats/paddlers, and hikers/horseback riders.

Surveys cited by the *Missoula County Parks, Recreation, and Open Space Plan* indicate the most popular recreation activity in Missoula County is pleasure driving. Therefore, there is a strong relationship between this activity and scenic open space resources shown on Map 6. The next most popular activities are picnicking, walking (preferrably near water), camping, and fishing. Many residents of Missoula County live in the urban area and are also concerned with developed neighborhood facilities ranging from tennis courts, pools, ice skating rinks, playgrounds, and athletic fields. Youth centers have been perceived as important in rural areas.

The Missoula County Parks, Recreation, and Open Space Plan outlines four levels of developed parks: regional, district, community, and neighborhood. Regional parks provide outdoor recreation in a natural setting. The Blackfoot River Corridor and the Clearwater River chain of lakes are examples of recreation complexes of regional signficance. District parks are generally improved recreation sites of 100-300 acres, such as Fort Missoula. Community parks cover about 50 acres and are exemplified by Playfair, McCormick, and Greenough parks. Finally, neighborhood parks are 4-16 acre sites (often located at schools) which are the focal point of a neighborhood. All levels except the latter are addressed in the following regional descriptions.

Recreational Needs

A detailed county map indicating all areas of existing or potential recreation use would not be meaningful: almost all public and private lands would be included for one reason or another. The Lolo Forest Plan, MDFWP's SCORP, *Missoula County Parks, Recreation, and Open Space Plan*, and Montana State Recreation Map provide detailed lists of all recreation areas, parks, campsites, picnic areas, fishing access sites, boat ramps, and other facilities. While not all the following types of land are shown on Map 5, they all serve important recreational functions. These include lands:

1) bordering rivers, creeks, and lakes;

2) visually and/or physically accessible, adjacent to public roads;

3) of scenic interest;

4) of historic or archaeolgical importance;

5) suitable for recreational development;

6) possessing ecological importance (for example, elk winter range, the importance of elk winter range to hunting);

7) of educational importance (nature study, local history, agricultural methods);

8) providing access to public lands;

9) suitable for district, community, or neighborhood parks; and

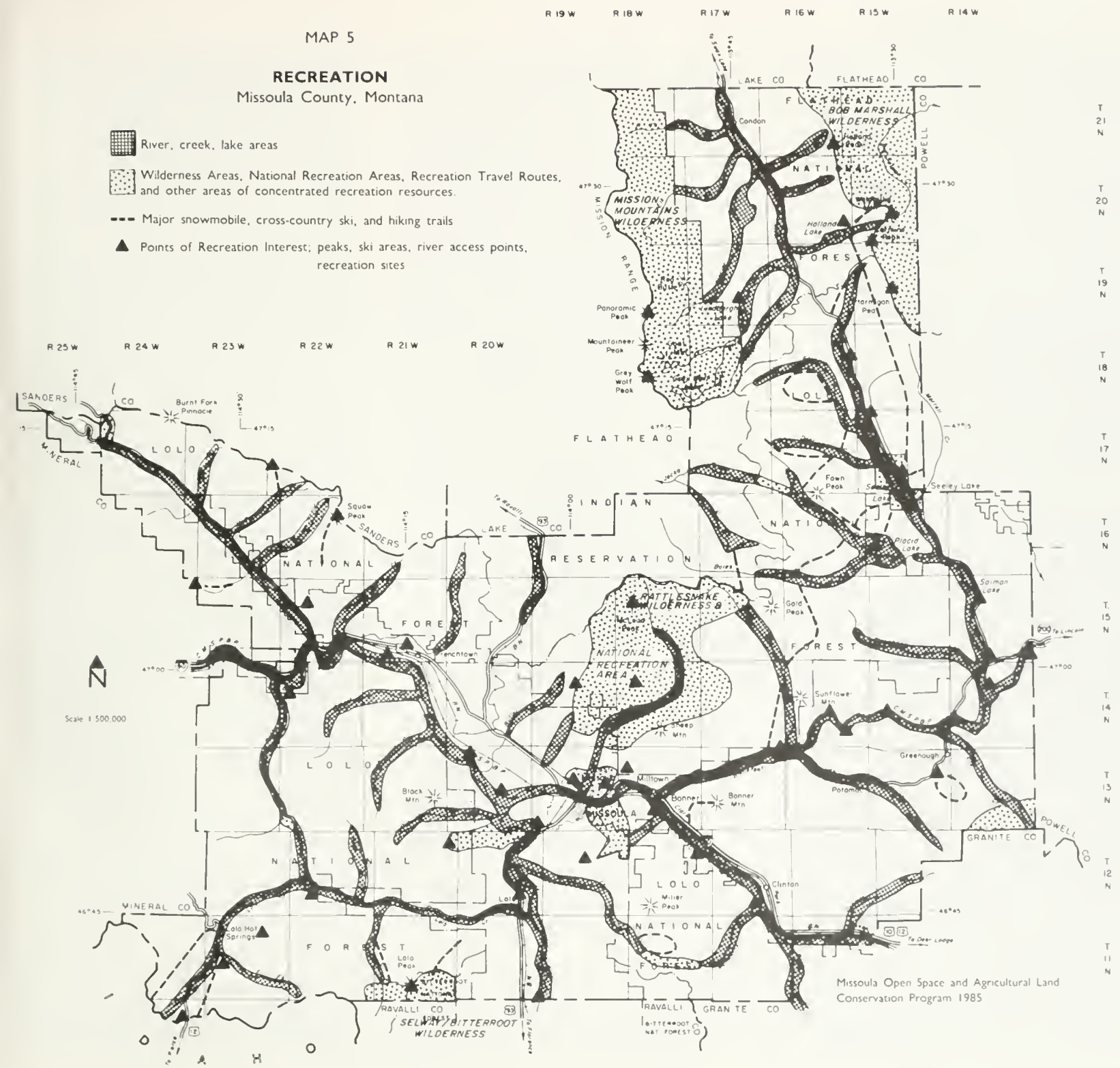
10) providing public trails.

High quality natural environments provide major recreation opportunities. Recreation demand is substantial and is escalating. These natural areas are also in great demand for conversion to potentially discordant intensive land uses, such as residential and recreational subdivision and development. Ironically, the same qualities which attract recreational use also attract development pressure.

MAP 5

RECREATION

Missoula County, Montana



Missoula Open Space and Agricultural Land Conservation Program 1985

The Regions

The following summaries highlight the recreational character of each of Missoula County's eight regions. Proximity to rivers, creeks, and lakes is the common thread which unifies the recreation resources of the regions. These resources are largely found on private lands. The MDFWP and the U.S. Fish and Wildlife Service (FWS) have evaluated and rated fisheries and recreation value of various rivers and creeks in Montana. All rivers, but not all creeks, in Missoula County have been rated at present. The ranking criteria include occurrence of state- or federally-designated threatened or endangered fish species, fish species of high interest to the state, and habitat restoration, reclamation, or mitigation potential. In Missoula County, the absence of threatened or endangered fish species resulted in rankings made on the basis of habitat quality for species of high recreational interest, such as rainbow, cutthroat, brown, and other trout. The ranking system includes five designations:

Class I—Highest Value Fishery Resource
Class II—High Priority Fishery Resource
Class III—Substantial Fishery Resource
Class IV—Moderate Fishery Resource
Class V—Limited Fishery Resource

Seeley-Swan

This lightly populated region provides diverse, high quality, year-round recreation experiences of national significance. The spectacular Mission Mountains and Bob Marshall Wilderness Area draw Montanans, as well as recreationists from all over the country, to hike or ride horseback into this backcountry. This is a headwaters region of lakes and small streams. The valley bottom portion of the region is a moist, forested landscape. The Clearwater River and its west fork are Class III fisheries along with Owl, Colt, and Placid creeks. Class IV fisheries include Marshall, Deer, Finley, and Boles creeks. Salmon, Seeley, Inez, Alva, Rainy, and Clearwater are the principal lakes located along the Clearwater River. These, along with Placid and Marshall lakes, comprise a regionally-important recreation complex. Boating, camping, picnicking, hiking, and fishing activities are focussed on the Clearwater River/chain of lakes resource. Agency personnel indicate greater access is needed to the Clearwater River between Seeley and Salmon lakes. Public recreation facilities and private interests mingle throughout this area. Facilities are reported to be adequate, but during summer weekends, campgrounds are usually full. The Salmon Lake and Placid Lake State Recreation Areas are particularly popular.

The Seeley-Swan region is the most heavily used snowmobiling area in Missoula County. There are about 2,000 registered snowmobiles in the county, with an estimated 2,000 more unregistered vehicles. Snowmobile use countywide has leveled off at about 8,500 snowmobile use days per year, but varies with snow and weather conditions. The Seeley Lake area has a trail system consisting of about 250 miles of groomed trails. This system supports approximately 4,520 days annually, or 53% of the total number appearing on DFWP's snowmobile counts for Missoula County sites. This compares with 1,770 days of snowmobile use at Lolo Pass, which is the next most popular area. Popular trails in the Seeley Lake complex include Seeley Lake to Ovando, Rice Ridge-West Morrell, Double Arrow, Marshall-Mount Henry, and Fawn Creek. This system is managed by the MDFWP, using gas tax funds. Current facilities appear sufficient to meet present and projected demands. Cross-country skiing is also popular. Some 26 miles of groomed trails exist northeast of Seeley Lake. The Ovando to Seeley Lake 50-kilometer cross-country ski race takes place in February.

The Seeley Lake-Jocko Road is a three-season recreational travel route linking the Evaro region with Seeley Lake. Many logging roads which wind through this region are similarly used for vehicular recreation.

The Swan River is rated a Class II fishery. Numerous informal access points exist on the Swan River. Class III streams include Glacier, Holland, Beaver, Elk, Kraft, Rumble, Cooney, Condon, and Cold creeks. Lindbergh and Holland lakes serve significant recreational functions. The Holland Lake area is the region's principal access point for entry to the Bob Marshall Wilderness. Holland Lake Lodge is a well-known commercial establishment providing lodging, meals, and access to lake and wilderness-oriented activities. Lindbergh Lake has a Forest Service campground. This lake and nearby Glacier Creek are the main trailheads for entry into the Mission Mountains Wilderness.

The Seeley-Swan region is a popular hunting area. White-tailed deer is the principal big game species taken, although elk, mule deer, black bear, and mountain goat are also successfully hunted. Grizzly bear have been hunted in the past. Trapping of furbearers occurs throughout this region.

The MDFWP and Forest Service have a keen interest in supporting water-related recreation here. Water access points, campgrounds, boat ramps, and other facilities may need to be expanded as demand rises. The conservation of river and lake corridors is fundamental to providing high quality recreation experiences within this region.

Potomac-Greenough

Like the Seeley-Swan, the major recreation demand in this region is for access to and use of water and riparian areas. The Blackfoot and Clearwater rivers are the principal recreation resources found here. The Blackfoot River, from its confluence with the Clearwater to its mouth at the Clark Fork near Bonner, is a Class I fishery. Upstream of the Clearwater River, the Blackfoot is rated Class II. In 1972, the State of Montana recognized the Blackfoot as a freeflowing "state recreational waterway." Agency personnel and recreation groups consistently stress the importance of the Blackfoot River for fishing, floating, swimming, picnicking, and camping. The Blackfoot has also achieved national attention as the site of an innovative and highly successful conservation and recreation program which began in the 1970s.

The Blackfoot River corridor has long been attractive as a place to live and recreate. The entire river functions as a linear, regional park. In the early 1970s, in the face of increased recreational use, a growing trend toward land subdivision and development, and a federal proposal to designate the Blackfoot River a "Wild and Scenic River," ranchers, cabin site owners, corporations, federal, state, and local agencies, together with The Nature Conservancy joined to address the future of the corridor. After some five years of work, *The Blackfoot River Conservation and Recreation Management Plan* was completed (TNC, U.S. Bureau of Outdoor Recreation, 1976). Two general topics were addressed: land conservation and recreational use.

In 1976, long before the current river access law was debated and passed, landowners along the Blackfoot recognized the river as a recreational resource of great importance to the public. They also knew river use and related problems of trespass, litter, and fires were increasing. The landowners' options were to either tackle these problems as individuals or to seek partners in comprehensively addressing the whole spectrum of recreation issues associated with Blackfoot River use. A concensus was reached among the parties that it was in everyone's best interest to work cooperatively to manage the recreational use of the river. *The Blackfoot River Conservation and Recreation Management Plan* formed the basis for a set of regulations which were developed for managing the area. These provisions were then incorporated in a Recreation Management Agreement which was signed by all public and private parties with interests along the river. Upon its expiration one year later, this agreement was renewed for an additional two years. This was followed by a five-year agreement. In April of 1985, a ten-year renewal of the Recreation Management Agreement was signed by all parties.

Today, a complete system of access points with parking lots (many on private land), recreation corridor signs, and recreation maps exist. A walk-in hunting area is also available in the Greenough portion of the Blackfoot drainage. The MDFWP supplies seasonal wardens to police the recreation corridor. Land conservation efforts have thus far resulted in over 5,000 acres and seven miles of river being voluntarily protected by perpetual

conservation easements. However, the majority of the river corridor is not presently protected by easement, and while existing conservation easements assure the existence of open space in the areas covered, they do not provide public access for recreational purposes.

This innovative approach to managing recreational use has been an outstanding success. As a result of the Recreation Management Agreement, the public has the right to responsibly enjoy the Blackfoot River, including access to specified sites on private land. The private landowners receive a partner in monitoring public use of the corridor and in enforcing rules stated in the agreement. This private-public partnership concept can be applied to any river corridor in Missoula County.

The MDFWP compiles visitor use statistics at various sites, based on estimates and automatic vehicle counter data. During the summer of 1976, 15,000 visitations were estimated to occur within the Blackfoot Corridor (Walker, 1977). By 1983, use had increased to at least 48,800 during the same period (MDFWP, 1983). This is more than a 300% increase, although the 1976 data is not as reliable as recent counts. Primary use areas and the number of summer visitors in 1983 are: County line (1,400), Roundup (4,400), Ninemile Prairie (1,700), Riverbend (2,900), Belmont Creek (1,200), Whittaker Bridge (8,600), Thibideau (9,300), Sheep Flats (1,300), Johnsrud Park (13,000), and Marco Flats (5,000). These numbers do not translate exactly into user days, as an unknown percentage of visitors may be counted at several sites on the same day. The Johnsrud Road at Johnsrud Park supported 43,200 visitations in 1983 from people headed up-river to any of the numerous recreation sites. Use is much higher downstream of the Roundup Bar Bridge than upstream.

Management of recreation within the Blackfoot River Recreation Corridor is responsive to changes in demand, impact on the land, and landowner concerns. Expansion of the area under conservation easements and cooperation with MDFWP and others are the primary actions which will benefit the recreation resource.

The Clearwater River in this region is rated a Class III fishery. The principle use areas are Clearwater Crossing (12,200 visits in 1983) and Harper's Lake. The same activities common to the Blackfoot River are popular along the Clearwater. However, access is more limited and floating opportunities were, until recently, greatly hampered by barbed-wire fences across the river. On June 1, 1985, the MDFWP and two dozen volunteers installed new fences with "Smith River Gates" to allow floaters to pass unimpeded. Additional work to eliminate more fence hazards is anticipated during the summer of 1985. This effort represents a landmark of cooperation between recreationists and landowners.

Few creeks in the regions have had their fishery and recreational value established. Gold, Belmont, and Blanchard creeks are Class III fisheries. Elk Creek is classified as Class IV fishery.

Snowmobiling is popular at the Gold Creek-Seeley Lake Trail, Garnet-Coloma area, and Mineral Peak Trail. Some 1,130 snowmobile days occur annually on these groomed trails. Cross-country skiing is extremely popular at the Lubrecht Forest nordic ski area during winters with sufficient snow. Ski touring, lessons, races, parties, and biatholon competitions all take place here. The Coloma-Garnet area is popular with both skiers and snowmobilers. The BLM rents cabins in Garnet.

Hunting for elk, mule deer, moose, and black bear occurs in various hunting districts in this region. Walk-in only hunting exists in the Greenough area. Substantial elk herds move about the region and winter in the Clearwater Game Range or on nearby private lands. In 1985, five hunting licenses for antlered bull moose were issued for the region. Furbearers are trapped in the mountains.

Clinton-Turah

Again, water-oriented recreation dominates the pattern of use in this region, which is split by the Clark Fork River. The Clark Fork is rated a Class II fishery, despite its history of mining-related pollution problems. Access to the river is generally adequate. A minimum of 2,300 recreational visitors enjoyed the river in the summer of 1983. The most popular developed sites are Turah (11,800 visitors), Beavertail Hill (9,900 visitors), and Schwartz Creek (1,400 visitors). Use of the Clark Fork is believed higher than the data indicates due to substantial fishing at informal sites. River use is increasing slightly. Conservation of the river corridor will ensure a scenic recreation resource and help maintain the present fishery.

Rock Creek is a Class I fishery. This nationally-acclaimed stream received recognition in 1972 as a "state recreational waterway." Special fishing regulations imposed in the late 1970s have greatly improved the creek's trout fishery. MDFWP personnel indicate the confluence of Rock Creek and the Clark Fork River has outstanding potential as a state park or other recreational area.

Evaro

Because the Evaro region is largely within the Flathead Indian Reservation, permits from the tribe are required to recreate here. Sacred tribal lands exist, particularly in the mountains. Recreational use carries with it a responsibility to visit only those area designated open by tribal authorities. Seasonal or day-use permits can be purchased. The most popular activities are fishing, hiking, and camping. The Jocko River and its forks are Class I fisheries. This nationally-significant resource is reached from the Jocko-Seeley Lake Road and adjacent logging roads. Information on the fishing sites should be received when a recreation permit is acquired. Access to the Rattlesnake Wilderness is possible from the south fork of the Jocko River. Access to the Mission Mountains Wilderness exists from the middle fork of the Jocko. Snowmobile use occurs at Jocko Pass.

Only two other waterways have been rated. Agency Creek is a Class III fishery, and Finley Creek is a Class IV fishery.

Missoula Valley

Most Missoula County residents live in and enjoy the diverse recreation resources of this region. It is not possible in the scope of this report to address the many detailed, site-specific developed and dispersed recreation resources available. Numerous recreation plans and programs exist simultaneously in this heavily-populated core of the county. These include Missoula County Parks, Recreation, and Open Space planning, City of Missoula Park Board and department activities, Missoula Redevelopment Agency, Clark Fork Riverfront Park efforts, County Golf Course Board, Fort Missoula Recreation Complex programs, as well as state and federal recreation facilities and planning. Recreation is an issue of interest to nearly everyone. The variety and quality of recreational opportunities available in this region rival those found near any urban or suburban center in the country.

The Rattlesnake Wilderness and National Recreation Area lies within a twenty-minute drive of most residents of the region. In no other American city do residents live so close to a similar resource. The area also serves important educational functions as an outdoor classroom. Visitor use currently focusses on hiking and camping, although running, horseback riding, bicycling, and cross-country skiing are also popular activities.

The Blue Mountain, Pattee Canyon, and Fort Missoula recreation complexes are important district parks. About 300 snowmobile days per year occur in the Blue Mountain area. Innertubing is a popular activity limited in recent years by lack of plowed parking areas. Pattee Canyon has two Forest Service day use picnic areas, hiking trails, and ten miles of nordic ski trails. Nearby Mount Sentinel is a major hang gliding take off point. The Pattee Canyon area has been closed to large groups because of traffic safety, vandalism, and littering problems. Recreation agencies indicate that a suitable large-group picnic site with a ball field and shelters is needed close to town. The Pattee Canyon-Deer Creek loop road is a popular recreational drive. The Fort Missoula complex provides golf, baseball, tennis, and fitness course facilities. The Fort Missoula access point on the Bitterroot River needs improvement, due to a steep bank.

The Missoula Valley is bordered by mountain ranges with many well-known peaks. Residents of the region often orient themselves or simply "rest their eyes" on these summits. Lolo Peak, Blue Mountain, Squaw Peak, Point 6, Stuart Peak, Mount Jumbo, Mount Sentinel, and Mount Dean Stone are frequent destinations of hikers. Trail access is more developed to some peaks than others. The many peaks surrounding Missoula, along with Waterworks Hill, McCauley Butte, and other, lower hills, form the framework for a comprehensive trail system.

The Clark Fork River is rated a Class II fishery. Missoula is fortunate to have a waterway suitable for fishing, floating, and swimming flowing directly through its urban center. Maintaining the river's water quality is crucial to the success of the Riverfront Park and numerous other recreation projects in the region. Upstream of the city, the Milltown Reservoir Wildlife Refuge provides the only flatwater paddling in the region. This area, which is off-limits to hunting, is also popular for bird-watching. Canada geese nest here in boxes provided by the MDFWP. The Sha-Ron Fishing Access Site in East Missoula averages about 3,400 visitors per year. Downstream of the city, the Council Grove State Monument (15,000 annual visits) and Kelly Island Fishing Access Site (14,700 visitors) are highly popular day use areas on the Clark Fork. Numerous other river access points such as Jacobs Island, Milltown Dam, and bridge crossings combine to create an excellent recreation waterway resource. Recreation specialists indicate the principal need is for river corridor conservation and coordination of city-county planning and parks activities with those of federal and state agencies.

The Bitterroot River is a Class II fishery. The recreational use of the river from the county line to its confluence with the Clark Fork at Kelly Island is increasing moderately. However, unlike the Clark Fork, there are significant gaps in the access system along the Bitterroot River. Substantial river recreation management issues also remain unresolved. The *Lower Bitterroot River Recreation Management Plan* (Stolba, et al.) identified the following as chief problems: lack of safe, convenient public access, unauthorized use of illegal or dangerous access points, lack of adequate and safe parking, littering and trash dumping, and unsafe swimming at certain places. Existing access points in the Missoula Valley Region from south to north include Buckhouse Bridge, Fort Missoula, Blue Mountain, Maclay Bridge, and Kelly Island Fishing Access Site. The MDFWP indicates a 5-10 acre fishing access site is greatly needed between Lolo and Kelly Island to alleviate problems associated with existing entry points. The Buckhouse Bridge site has major parking and highway safety problems in addition to the dangerous practice of diving from the bridge. The Fort Missoula site has high, steep banks. The Blue Mountain access area is presently restricted by limited parking and water access. The usefulness of the Maclay Bridge sites is severely hampered by the land ownership pattern, limited parking, and steep banks. In addition to access and facilities issues, the conservation of the riparian corridor is also widely recognized as the foundation for all recreation resource management.

Rattlesnake, Miller, and Grant Creeks are Class III fisheries. O'Brien, Deer, and Plant Creeks are Class IV fisheries. Many streams are not presently ranked. Rattlesnake Creek lies at the heart of the Rattlesnake Wilderness and National Recreation Area. City and county officials identify the creation of a recreation and conservation corridor along the creek from the recreation area boundary to Greenough Park as a significant need. The Miller Creek-Schwartz Creek loop road is used for vehicular recreation, berry picking, firewood gathering, and as access for snowmobiling (150 visitor days annually). The 13-mile Plant Creek-Holloman Saddle cross-country ski trail is popular in years when suitable snow conditions exist.

Hunting for big game, upland game birds, and waterfowl occurs in the region, although not as intensely as more rural areas. Big horn sheep are hunted in the Black Mountain area. Moose are sought in the Black Mountain and upper Miller Creek areas. The MDFWP indicates a public rifle range is needed in the Missoula Valley area for sighting in rifles and for general recreational shooting.

The SnowBowl and Marshall downhill ski areas are experiencing substantial increases in use. New runs have been created at SnowBowl. Marshall has also expanded their runs, added snow-making machines, and increased the available hours of night skiing. Nordic skiers are increasingly common at the downhill areas.

Bicycle recreation and commuting are increasingly popular in the this region. The City of Missoula has a bicycle coordinator to conduct safety class and other educational programs. A map of bicycle routes within the urban area has been produced by the City. Races are held frequently. The route of the annual Tour of the Swan River Valley (TOSRV) begins in Missoula, winds up Highway 200 along the Blackfoot River to Clearwater Junction, turns north through the Seeley-Swan region, and ultimately leads back to Missoula via the Evaro region.

In addition to urban recreation, commuter use, and organized tours and races, bicycles are used more and more for dispersed recreation off paved roads. With the popularity of "mountain bikes," the Rattlesnake Wilderness and National Recreation Area has become a popular site for bicyclists. Primary activities are fishing, day-trips, and camping. Pattee Canyon and the old Milwaukee Road right-of-way from the University of Montana to Milltown are among the other routes gaining favor. Missoula-based Bikecentennial Incorporated is presently inventorying non-urban bicycle recreation in the region. This work will result in a map and guide to bicycle recreation opportunities. Since the majority of rural biking occurs on public land, there are relatively few obstacles confronting this sport. In fact, Forest Service road closures benefit bicycling by eliminating conflicts with motorized vehicles. Occasional hiker-biker conflicts are noted in the Rattlesnake, but thus far, these pursuits appear compatible. The principal need related to bicycling is for trails along the Clark Fork and Bitterroot River corridors.

An inventory of all county-owned land has been assembled by the Missoula Parks and Recreation Department. This print-out contains information on parcel size, present use, and other factors pertinent to suitablility for recreation and other public purposes. Careful analysis of this catalog is warranted to determine how county lands can be used to benefit recreation and conservation planning efforts.

Lolo

The Lolo region provides year-round recreation opportunities near water and in the mountains. The Bitterroot River here is a Class II fishery. This extremely popular waterway has several significant recreation management problems. The primary access points are the Chief Looking Glass fishing access site (23,900 visitors annually) located at the county line, Riverside Park, and the sewage treatment plant at Lolo. The MDFWP identifies the gap in access between Chief Looking Glass and Lolo as one of two top priorities for land or easement acquisition in Missoula County.

Lolo Creek, from the confluence of its east and west forks, is also a Class II fishery. Formal access is provided at Lee Creek and Lewis and Clark campgrounds. Other access sites are common and include Fort Fizzle, bridge crossings, and roadside turnouts. Lolo Creek is used primarily for fishing. The shallow, boulder-strewn channel makes floating and swimming difficult. Lolo Trail has potential as a recreational resource.

Class III fisheries include the east and south forks of Lolo Creek, as well as Grave, Howard, Lee, and Butte creeks. The west fork of Lolo Creek and Mill Creek are Class IV fisheries.

Lolo Pass is a major winter recreation area with approximately 20,000 recreation visitor days (RVD's) per year. The pass is busiest from December through April. The State of Idaho and Clearwater National Forest share management responsibility for the area. About 12,000 "Park and Ski" stickers were sold in the winter of 1984. A sticker is needed to use the parking lot at the Lolo Pass Visitor Center, and the parking lot is usually full on winter weekends. About 18,000 or 90% of all

RVDs on Lolo Pass are associated with cross-country skiing. About 60 miles of ski trail exist in the area, although only 15 miles are groomed. Approximately 80-100 miles of snowmobile trails are available, but the number of groomed miles varies from year to year. Conflicts between snowmobilers and skiers have been avoided, primarily due to the creation of separate trails. The problem of dogs on ski trails continues. Cooperative management of this area by various agencies has thus far been successful in providing high quality recreation to an increasing number of recreationists.

Vehicle use on logging roads is popular in this region, particularly the Graves Creek-Petty Creek loop road. Hunting for elk, moose, deer, and black bear occurs. Access to Lolo Peak and the Selway-Bitterroot Wilderness Area is provided from formally-designated trailheads on Mormon Creek Road and the south fork of Lolo Creek.

Frenchtown-Huson

The Class II Clark Fork River provides the focus for recreation in this region. Harper's Bridge (6,700 annual visitors), Erskine Fishing Access Site near Huson (6,500 annual visitors), and Petty Creek Fishing Access Site (6,400 annual visitors) are the main developed access points. Undeveloped informal sites exist at Frenchtown and at railroad and highway bridges over the river. Access appears adequate on the last stretch of placid water prior to Alberton Gorge. Frenchtown Pond State Recreation Area is an extremely popular recreation site. Some 38,900 visitors swim, picnic, and sunbathe at the pond each year. Frenchtown Pond is also a favorite place for novice kyackers. Petty and Mill creeks are Class III fisheries. Class IV fisheries include Deep, Rock, and Albert creeks. Sixmile Creek is presently unranked.

Vehicular recreation activities are pursued on the logging and agricultural roads of the region. The Petty Creek-Grave Creek loop road provides a link with the Lolo region. Motorcyclists and the MDFWP indicate a need for motorcycling facilities in the Harper's Bridge-Deep Creek area.

Hunting is popular in this region. Big horn sheep are sought in Petty Deep, and Albert Creek drainages. Elk, mule deer, white-tailed deer, moose, and black bear are also hunted. Waterfowl hunting takes place on the Clark Fork River. The area near the pulp mill is favored.

Ninemile

Ninemile Creek is a Class III fishery which bisects this region composed primarily of public land. Fishing is the most common activity on Ninemile Creek which is generally unsuitable for floating. Butler Creek is also a Class III fishery. Stoney, McCormick, and Pine creeks are Class IV fisheries.

The rural landscape of "the Ninemile" attracts many for pleasure drives and informal, low-key activities. The area may also be used for hiking. Squaw Peak is a popular climb. Formally-designated trailheads exist in Stoney and Sixmile drainages. McCormick Peak is reached by trail from McCormick Creek Road. Reservation Divide provides many other hiking options.

Vehicular recreation is pursued over Siegel Pass in Sanders County. This route can be used as a loop back to Missoula via I-90 or Highway 93.

Elk, deer, black bear and other species are hunted in the mountains which form the Ninemile Reservation Divide ranges. Horseback riding is popular with both hunters and non-hunters.

OPEN SPACE RESOURCES

Open space, in the simplest sense, is where there is little or no development. These essentially open portions of the landscape are generally used for agriculture or forestry. In this broad context, each region possesses open space. This section will address open space which is significant in its own right. Agricultural lands, however, are treated in a separate chapter.

Open Space Overview

Significant open space includes those areas which are for the scenic enjoyment of the general public or which are identified as "important" pursuant to a clearly-delineated government conservation policy (Tax Treatment Extension Act of 1980 and Montana Open Space Land and Voluntary Conservation Easement Act of 1975). Therefore, the definition of open space is separated into land which are "scenic" and lands which serve "important non-scenic functions." In both cases, the open space must yield a significant public benefit and may be oriented to farmland and forest preservation.

Significant public benefit is demonstrated by:

1) The uniqueness of the property, its scenic or other qualities which make it unusual or important.

2) The intensity of development pressure relative to open space, considering both existing development and foreseeable trends.

3) The compatibility of the proposed use with public programs for non-scenic conservation in the region. These programs can include water supply protection, water quality maintenance or enhancement, flood prevention or control, erosion control, shoreline protection, and the protection of land included in or related to a government-approved master plan or land management area.

4) Specific government policy intended to protect property identified as worthy of protection or conservation.

Scenic Open Space

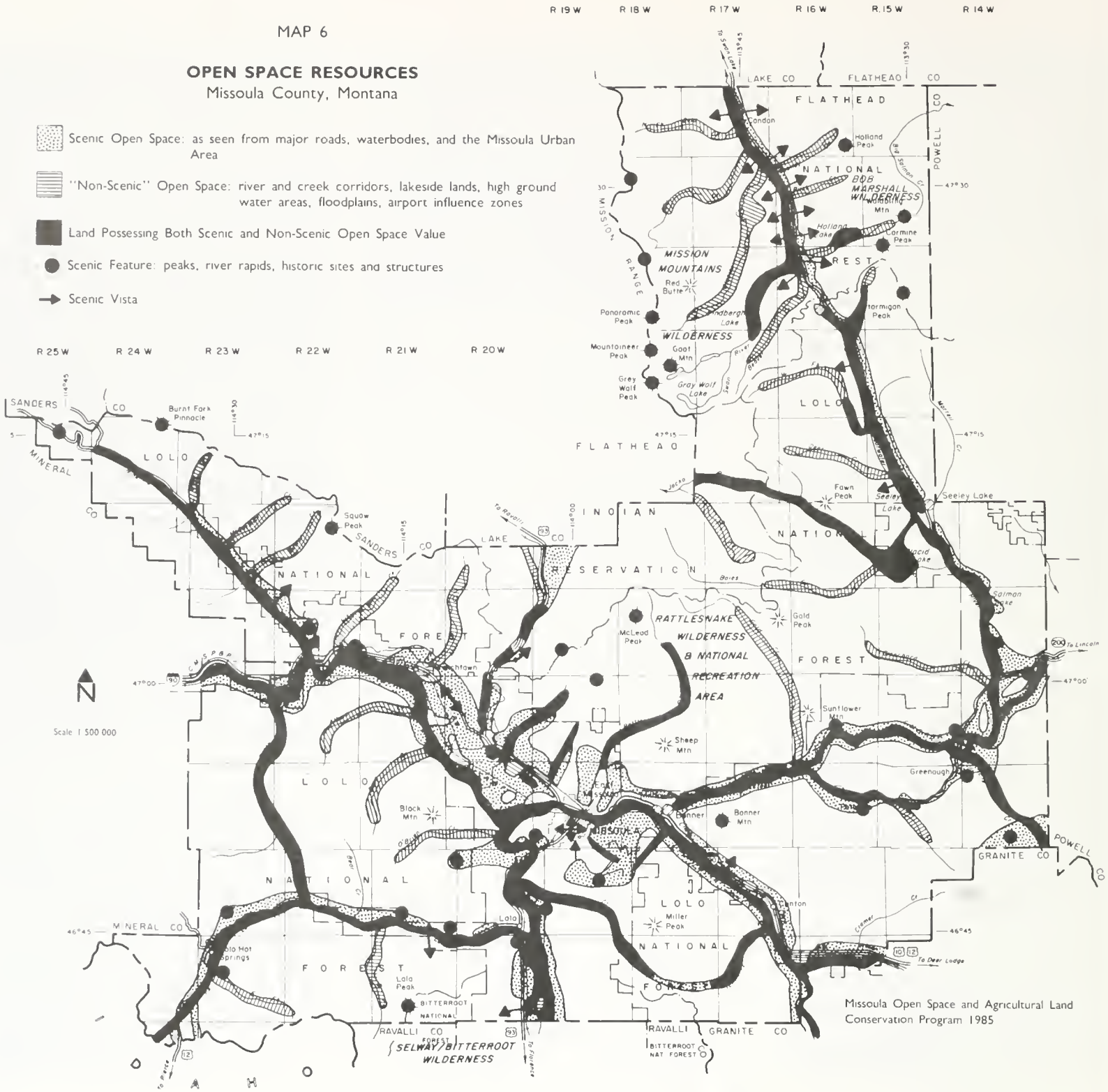
Federal law considers scenic open space to be those areas which contribute to scenic panoramas which can be enjoyed from a park, nature preserve, public road, water body, trail, historic structure or land area, or which provide a visual buffer around important open space features. Visual, not physical access, may be sufficient for the public to appreciate such values.

Conservation of scenic open space around highways, waterways, visually-accessible scenic sites, and public land gives rise to linear corridors and nodes where open space values are concentrated. Missoula County Parks, Recreation, and Open Space Plan (1976) indicates that "because they are viewed by the most people for the

MAP 6

OPEN SPACE RESOURCES

Missoula County, Montana



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longest period of time, areas seen from Missoula or from travel corridors such as roads and water bodies are most significant as visual resources." Approximately 40% of Missoula County is visually accessible to the public from main travel corridors (see Map 6).

Driving for pleasure is the most common recreational activity enjoyed by people in the county. Roadside lands comprise the visual foreground for the traveling public. Features of the foreground control the quality of the entire view, so that a small percentage of development can change the visual character of a much larger area. Increments of change may seem unimportant, but the cumulative effects of development can be significant.

For this report, easily visible, essentially undeveloped lands within the foreground along all major roads were identified during field work. Scenic lands around rivers, major creeks, and lakes were mapped mostly by interpretation of topographic maps and aerial photographs and supported by field analysis for portions of the Blackfoot, Clark Fork, and Bitterroot rivers. Mile-wide buffers are important adjacent to large blocks of public land, particularly those areas managed for recreation, wildlife, and scenic values. However, in the interests of clarity, the entire open space buffer is not shown on Map 6. Only more critical scenic open space is delineated, as well as lands which the Bureau of Land Management has determined to be Class A Scenery—Highest Scenic Value. Important scenic areas which are visible from the Missoula urban area and recognized in the 1980 Conservation Bond as well as other important urban fringe lands are delineated on Map 6.

Non-Scenic Open Space

Non-scenic open space is simply open space which is not readily visually accessible. Land adjacent to rivers, major creeks, and lakes, including floodplains and high groundwater areas, serve many high-priority, non-scenic open space functions. Conservation of these areas is recommended by a variety of public programs, including floodplain protection and erosion control programs. Floodplains store water and release it slowly, thus reducing flood peaks and providing higher in-stream flows throughout the summer. This aquifer recharge benefits the local water supply as well as serving the needs of wildlife. Floodplains play a major role in water purification as they filter pollutants for both point and non-point sources. Riparian vegetation helps prevent erosion which reduces the sediments loads found in rivers. Sediment can significantly reduce local fishery production.

The floodplains of rivers and major perennial creeks are shown on Map 6. Official Federal Emergency Management Agency Flood Insurance Rate maps were used where such designations exist. In areas where no official maps exist, air photo interpretation was used to conservatively approximate floodplains. High groundwater areas are generally located next to rivers and lakes. However, substantial amounts of marshes, sloughs, swamps, and sub-irrigated meadows exist in areas other than floodplains, particularly in the Seeley-Swan, Potomac-Greenough, and Lolo regions. Due to the complexity distribution, these latter high ground water areas have not been mapped.

Buffer zones for airport noise and safety, municipal water supply, and pollution sources have non-scenic open space value.

Subdivision Activity

Residential, commercial-industrial, and certain types of recreational development are the principle threats to maintenance of open space. Of those types of development, residential building is the most prevalent land use affecting open space and related values. Secondary threats may include billboard advertising, concentrated recreational use, mineral exploration and development, littering, certain forms of unregulated off-road vehicle use, power lines, overgrazing, and logging.

Residential land development in Missoula County, as in any region, is a function of major economic, political, and natural events. Subdivision activity in this county can be correlated with historical events like the extension of railroad lines and the opening of the University of Montana. Land development can also be attributed to national economic trends and local population increases of the 1960s and 1970s. State laws governing subdivision development and, to a lesser extent, agricultural land taxation have had an affect on local land development rates and patterns over the last 20 years. The rate of residential subdivision, location of areas experiencing subdivision, and total subdivided land area have a substantial influence on the continuation of existing patterns of open space and related public values on private land.

Land development trends from the 1960s to the present demonstrate a substantial growth in the number of acres subdivided (see Map 7). Approximately 8000 acres were subdivided in 1974, 1978, 1980, and 1984, and relatively small acreages were subdivided in intervening periods (see Figure 1). This subdivision activity includes both subdivision of raw land and redivision of existing lots. The urban built-up or developed areas of the county amount to 19,949 acres (as of 1979). In the last five years (1980-1985), 23,537 acres have been subdivided (see Table 1). Since approximately 90% of the splits were created through the Certificate of Survey process, and half the COSs in the late 1970s were redivisions, we can estimate conservatively that nearly 10,000 acres of previously unsubdivided land has been subdivided in the 1980s. This is equal to half the cumulative total of developed land.

TABLE 1
SUBDIVISION ACTIVITY IN THE 1980s

Year	# COS	# Plats	Acreage Subdivision by COS	Acreage Subdivision by Plats
'80	236	13	6981	304
'81	144	14	4534	317
'82	66	9	1037	136
'83	81	9	1654	362
'84	123	29	7047	221
To 4/85	28	2	724	220
Totals:	678	76	21977	1560

Source: Office of Community Development, July 1985

The method of subdivision currently includes two processes. One process, referred to as "plat" in this text, is subject to environmental assessment and public opinion. The other method, Certificate of Survey (COS), is exempt from public review. Currently 90% of the acreage experiencing subdivision activity is not subject to review using public interest criteria. The public interest criteria considered through local subdivision regulations and applied to approximately 10% of platted subdivisions in the last 10 years is as follows: 1) Need, 2) Expressed Public Opinion, 3) Effects on Agriculture, 4) Effects in Local Services, 5) Effects on Taxation, 6) Effects on the Natural Environment, 7) Effects on Wildlife and Wildlife Habitat, and 8) Effects on Public Health and Safety. The Certificate of Survey (COS) process requires only a formal review of the land survey by the Surveyors Office or the Engineering Department and a review of sanitary requirements by the Missoula Health Department.

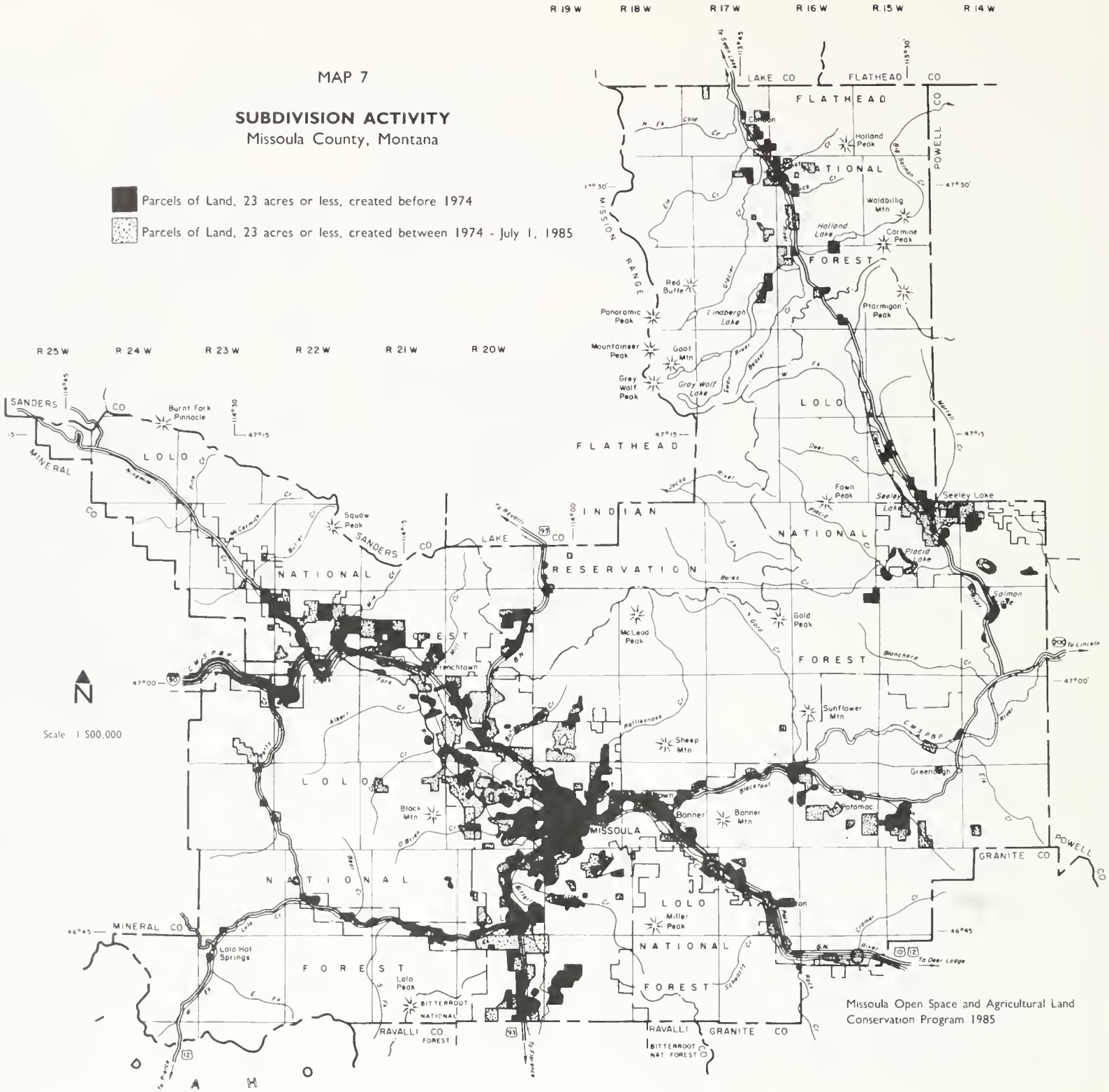
Population projections indicate a continuation of growth in Missoula County but at a slower rate than the 1960s and 1970s. Missoula County has experienced a 30% increase in population in the period of 1970 to 1980. The City of Missoula experienced a 13% increase since 1970. "Low range" projections for the period of 1980 to 1990 forecast an 11% increase countywide. For the period of 1990 to 2000, a 14% increase is the "low range" forecast. Household size is decreasing. Therefore, more households will be formed per 1,000 population.

Existing vacant land already subdivided will capture some of the expected demand for new housing. However, periods of population growth have always been associated with subdivision activity. Together with population increases, political and economic factors, although not discussed in this text, will determine the rate and location of subdivision activity during the next 15 years.

MAP 7

SUBDIVISION ACTIVITY

Missoula County, Montana



Missoula Open Space and Agricultural Land Conservation Program 1985

FIGURE 1

ACREAGE SUBDIVIDED ANNUALLY FROM 1973 - 1984
Missoula County, Montana

Certificate of Survey (COS): A drawing of a field survey prepared by a registered land surveyor for the purpose of disclosing facts pertaining to boundary location and monumentation. COS is also referred to as State exemptions to local subdivision regulations.

Plat. A drawing of a subdivision prepared for filing for record with Missoula County Clerk and Recorder and containing all elements as set forth in locally adopted subdivision regulations.

Missoula Open Space and Agricultural Land
Conservation Program 1985

The Regions

The Missoula County Parks, Recreation, and Open Space Plan (1976) described the general open space character of the county and analyzed its relationship to recreation. Lands adjacent to roads, rivers, lakes, historic sites, existing recreation areas, and the urban areas were highlighted as significant open space. This study builds upon that foundation by detailed mapping of these and other types of scenic and non-scenic open space resources. All population projections are low-range estimates taken from *Missoula County Population Analysis*.

Seeley-Swan

The spectacular open space qualities of the Seeley-Swan region are characterized by the twin ramparts of the high, glaciated Mission and Swan Ranges which flank each side of a flat, forested valley. The major scenic and non-scenic open space resources of this large region are located in the narrow corridor which parallels Highway 83, the Swan River, and the Clearwater River with its chain of lakes. Much of this region, as viewed from Highway 83, would qualify as Class A—Highest Scenic Value land, using the Bureau of Land Management's Visual Resource Management System (VRM). River corridors, wetlands, land along the Jocko-Seeley Lake road, and the border of the Mission Mountain and Bob Marshall Wilderness areas are other key open space lands.

Highway 83 is a major north-south recreational highway, popular with tourists visiting the Seeley-Swan area, as well as travelers to Flathead Lake and Glacier National Park. This road is part of a favored loop from Missoula to Big Fork and back. The visual open space along Highway 83 is mostly a narrow corridor defined by dense roadside forests. These canyons of trees are broken by vistas across lakes, such as Salmon, Seeley, Inez, and Alva, and by occasional cleared pastures and developed areas. The Highway 83 open space corridor is very visually sensitive. Most of the non-corporate private land in this region is located along this corridor. Where the forest is cut and converted to pasture, scenic vistas are open with views to the spectacular crestlines of the Mission and Swan Ranges. This is particularly true in the north half of the region. The front of the Swan Range is a roadless area. However, where residential, recreational, commercial, or industrial development occurs in roadside clearings, there is often a signficant reduction in visual quality. Substantial amounts of development can be accommodated in the region without loss of visual quality, if structural set-backs of non-contrasting building colors with non-reflective exterior materials and/or forest buffer zones are established along the highway. The same concerns apply to other travel corridors such as the Jocko-Seeley Lake road which forms part of a popular road which links the Seeley Lake area with the Evaro region.

The Clearwater and Swan River corridors, including the chain of lakes, are signficant scenic and non-scenic resource areas. These rivers and lakes are heavily used by recreationists. The non-scenic value of these riparian corridors in water quality maintenance, flood and erosion control, and water supply is shared by all perennial creeks and numerous wetlands in this region. Many high groundwater areas are not included on Map 6, due to the hydrological complexity of the area, particularly within the Swan River drainage basin. Refined mapping and a rural area plan will be necessary to precisely delineate the non-riverine wetlands.

In this region, the Bob Marshall and Mission Mountains wildernesses, Seeley Lake Game Preserve, Clearwater Game Range, Forest Service campgrounds and recreational facilities, and other public lands serve important open space functions. The boundaries of these areas are also signficant as open space buffer zones. Most buffer zones are managed by federal and state agencies' for visual retention or partial retention of forest canopy to maintain high scenic quality. Corporate management practices vary.

An estimated 2,943 more people are expected to become residents of the Seeley-Swan and Potomac-Greenough regions by the year 2000. The focal point of subdivision is occuring at Seeley Lake and just south of Condon. Areas also experiencing subdivision activity in this region are Swan River, south of Lake Inez, Placid Lake, Cott Lake, and Fish Lake.

Potomac-Greenough

High quality scenic lands along the Blackfoot and Clearwater Rivers and Highways 200 and 83 constitute the majority of the significant open space in this lightly populated but heavily used region. The BLM has identified these previously-described areas as possessing Class A—Highest Scenic Value. This heavily used river recreation corridor contains spectacular scenic resources, such as bedrock canyon walls, rapids, vistas, and wildlife. Two popular roads—Ninemile Prairie-Johnsrud Park and Sunset Hill parallel the river and offer many scenic rewards. Lands adjacent to the Blackfoot and Clearwater Rivers, along with Gold, Elk, Blanchard, Belmont, Union, Ashby, and numerous other creek, serve important water quality and other non-scenic functions.

Although bordered by important scenic open space, views along Highways 200 and 83 are restricted by trees and canyon walls in portions of the lower Blackfoot Canyon, Lubrecht Forest, and other areas. However, the Potomac Valley, Ninemile Prairie (Greenough), and Clearwater Junction areas consist of open agricultural landscapes and scenic vistas. Sub-irrigated hay meadows in the Potomac Valley dominate the view south of Highway 200. This one-mile wide expanse of riparian and high groundwater area is important for retention of scenic and non-scenic open space value in the valley. The existing residential development has thus far been located in the forests further south. Much more development can be accommodated without loss of visual quality if non-farm structures are built along meadow edges or in the forest and are of non-reflective building material and non-contrasting exterior colors. These considerations also apply to the broad agricultural valleys at Ninemile Prairie and Clearwater Junction.

Scenic vistas also exist in the Potomac Valley south across the meadows and west to the Rattlesnake Mountains ridgeline, at Greenough, at Clearwater Junction, and at many points along the Blackfoot River. Additional features include the Potomac and Sunset Hill Schools and the Coloma-Garnet-Yreka historic district accessed via Elk Creek Road.

This region is expected to share with the Seeley-Swan area an increase of 2,943 residents by the year 2000. The current population is approximately 530 and is expected to double during the next 15 years. Areas experiencing subdivision are Prairie Creek, Game Creek, Arkansas Creek, Norman Creek, and Camas Creek.

Clinton-Turah

The Clinton-Turah region was a primarily agricultural area as recently as 1970. Today, the landscape is a mosaic of pastoral remnants with increasing residential development. The linear strip of flat, private land within the Clark Fork River valley is also a major east-west transportation corridor. I-90, two railroad beds, frontage roads, and the Clark Fork River crowd the valley bottom. A shrinking band of scenic open space parallels these features. Vistas exist to the rivers and surrounding Sapphire Mountains which lie north and south of I-90. Most of the valley bottom is open with cottonwood forests in the background. Pine forests adjoin roadways near Turah and other areas. Housing can easily be placed in these stands with no loss of scenic quality. Roadside developments within pastures have no natural screening. Vegetation plantings may yield some reduction in the visibility of these structures as well as reduce road-related visual and noise impact on residents.

Non-scenic functions are served by lands in the floodplain of the Clark Fork River and Rock, Schwartz, Cramer, and other creeks.

An increase of approximately 700 people is expected in this region by the year 2000. Recent subdivision activity has occurred along the Clark Fork River and in the Wallace Creek area.

Evaro

Highway 93 bisects the west half of this region. Views are limited by forests at Evaro Hill but open to a spec-

tacular vista of the distant Mission Mountains and Rattlesnake Range. North of Evaro, the pastoral Jocko Valley widens with views of agricultural land, livestock, and the distant foothills. Housing is beginning to occur along Highway 93 in open pastures. Little natural screening exists. Housing within forests adjacent to the Jocko River is nearly invisible. This river corridor provides scenic and non-scenic open space. Lands along the Finley, Agency, and other creeks are also significant open space areas.

Missoula Valley

The Missoula Valley region is by far the most heavily populated portion of the county. The combination of urban, urban fringe, and rural residential densities of development combined with a variety of roads, rivers, creeks, historic and landform features, and recreational areas creates an extremely complex open space pattern.

The Missoula Valley is a deep, broad structural basin surrounded by the Rattlesnake, Sapphire, and northern Bitterroot Mountains. Most of the undeveloped valley bottom, basin-fill benches, and lower south- and west-facing mountains are in pasture or are mantled in grassland. Forested residential areas are not common, but may be found in Pattee Canyon, O'Brien Creek, and the upper ends of other lateral creeks of the Clark Fork River. The higher, steeper, and less forested the land, the more visible it is from rivers, roads, and the urban area. Therefore, nearly all of the existing scenic open space within this region is extremely visually sensitive.

Open space lands paralleling I-90, Highway 93, Mullan Road, and major frontage roads are significant. The Pattee Canyon Drive-Deer Creek and Miller Creek-Schwartz Creek loops, as well as SnowBowl and Marshall ski area roads are also important recreational and scenic travelways. Key open space lands viewed from the urban area include Mount Jumbo, Mount Sentinel, the Clark Fork, Bitterroot, Rattlesnake and other riparian corridors, Mount Dean Stone/Upper Farviews, Lolo Peak, Blue Mountain, McCauley Butte, Point Six, Stewart Peak, and the north hills. Vistas exist in all directions from the urban core. Other important scenic areas include buffers around the Rattlesnake National Recreation and Wilderness Area (RNRAW), the Selway-Bitterroot Wilderness Area, Blue Mountain and Pattee Canyon recreation areas, the Mount Sentinel and Clark Fork River conservation reserves, the public-private land boundary, and the many historic sites and structures found in the region.

Lands along the Clark Fork and Bitterroot rivers serve significant scenic and non-scenic functions. Rattlesnake, Grant, Butler, Miller, Pattee, Deer, O'Brien, and numerous other creeks are bordered by key open space terrain. The Rattlesnake Municipal Watershed is now federally-owned. The Missoula County Airport influence zone is shown on Map 6. All development within this zone is required to pass resolution of the County Commissioners to meet special requirements in excess of existing zoning regulations.

The majority of population increased and subdivision activity is expected in this region. An estimated addition of 11,500 people are likely to become residents by the year 2000. Areas currently experiencing subdivision include Big Flat, Pattee Canyon, Grant, Butler, Wye/O'Keefe, and Rattlesnake creeks, South Hills, Miller Creek, and Mullan Road.

Lolo

Developable private land within this region is generally located within the broad Bitterroot Valley and the narrow Lolo Creek Valley. Scenic and non-scenic open space along the Bitterroot River, Lolo Creek, and Highways 93 and 12 encompass nearly all such resources in this increasingly populated region. Intensive development exists along Highway 93 from the northern boundary of the region until approximately one mile south of Lolo. At this point, development stops, and the traveler enters a rare, undeveloped portion of the Bitterroot Valley. The rugged Bitterroot Front rises to the west, and the lower Sapphire Range lies in the distance to the east. Hay meadows along the highway are replaced by cottonwood forests closer to the river. Sparse residential development begins once again on the westside benchlands about two miles further south. Most of the ponderosa pine have been removed from these benches, thus eliminating all vegetative screening of structures. Replanting beside structures and along the west side of Highway 93 would improve visual quality, a concept that will become more and more true as development increases. The scenic floodplain of the Bitterroot River is one to two miles wide throughout most of the region.

The sinuous Lolo Creek-Highway 12 open space area possess terrain which appears to meet the BLM criteria for Class A—Highest Scenic Value. Because riparian and scenic corridors also contain four important historic sites and structures (the Lolo Trail, Fort Fizzle, Woodman Schoolhouse, and Mud Creek Ranger Station), a scenic buffer is shown around Lolo Trail on Map 6. The agricultural land around Woodman Schoolhouse provides an historically and visually compatible setting for this structure. The Graves Creek-Petty Creek loop road is considered important open space for scenic and hydrological reasons. As in other regions, bottomlands along perennial creeks and the public land/private land boundary have significance. Lands surrounding the Selway-Bitterroot Wilderness have national importance as a visual buffer.

The expected increase in population for this region by the year 2000 is 8,500. This is the second-fastest growing region in Missoula County.

This region is expected to share an increase of 6,100 residents with the Ninemile region by the year 2000. Areas of current subdivision activity are Sleeman and Mormon creeks, and south of Lolo along Highway 93 to the county line near Carlton Creek.

Frenchtown-Huson

Frenchtown Valley is the western extension of the Missoula Valley landform. Therefore, the open space pattern within this growing region is similar to that already described for Missoula Valley. The Bitterroot River, Highway 93, and the Mullan Road are the main travel corridors and largely define visible open space. An interwoven pattern of agricultural fields and residential subdivision covers much of the valley bottom and foothills along the region's north side. The valley narrows west of Frenchtown and consists almost entirely of the floodplain of the Clark Fork River. West of Huson, I-90 and the river enter a deeply-incised, narrow canyon with a thin band of adjacent open space. Major creeks and their associated non-scenic open space include Sixmile, Mill, Albert, and Deep creeks.

Ninemile

This region consists of a long, moderately narrow structural valley bisected by Ninemile Creek and bordered by the mountains of Ninemile and Reservation divides. This region is primarily rural, with sparse residential development at its lower end and agricultural operations at its upper end. Substantial development can be located in forested areas with little or no loss of visual quality. Portions of the roadway are in dense forests which greatly reduces the amount of the landscape which is easily visible. The visibility of roadside development in forested sites is strongly reminiscent of the Seeley-Swan region. Scenic open space occurs primarily on the valley bottom and lower foothill slopes northeast of the Ninemile Road. The floodplain of Ninemile Creek serves both scenic and non-scenic purposes. Land beside lateral creeks, such as Pine, McCormick, and Butler Creeks, is important non-scenic open space. Scenic features also include Squaw and McCormick Peaks.

Ninemile is expected to share an increase of 6,100 people with the Frenchtown-Huson region by the year 2000. Since there is so little developable land in the Ninemile region, only a small percentage of population growth is expected here.

ECOLOGICAL RESOURCES

Missoula County residents live in a landscape filled with an impressive array of ecological resources. Wildlife, among which are threatened and endangered species, high quality mountain and plains ecosystems, and unique riparian ecosystems are distributed throughout the county's mountains and valleys. Although public land harbors substantial quantities of natural resources, many species and ecological communities are found on private land. Deer, waterfowl, raptors, fish, and upland game birds are among the many creatures which are highly dependent on private land for all or critical phases of their lifecycles. Presence of important ecological qualities on private land generally attests to the fact that many private land uses are not incompatible with wildlife and other resources. However, there are other land uses which can threaten these resources. The conversion of open space and agricultural lands to intensive development, recreation activities, timber harvest in certain areas, and agricultural practices such as over-grazing and de-watering of streams are often in conflict with long-term maintenance of the county's ecological inheritance.

The following reconnaissance, although not a detailed account, provides a description of the significant ecological resources found in Missoula County. Emphasis has been placed on private land. The accompanying maps illustrate areas which contain those resources.

Ecological Overview

Missoula County is ecologically wealthy. Some 300 species of birds, 23 species of waterfowl, 20 species of small game, 10 species of big game, and numerous reptile, amphibian, and insect species utilize the varied ecological systems (ecosystems) which characterize the county's terrain. Riparian, grassland, parkland, forest, and alpine communities which mantle the county's landforms contain a diverse array of plants on which all species of wildlife ultimately depend. Highly productive river, creek, and lake habitats support fisheries and the complex food webs on which they rely. Individual ecosystems are not islands unto themselves, but are linked to every other ecosystem in the area. Every facet of ecological resources in Missoula County is important, but this section focuses on resources which have been clearly recognized as significant by the public.

Big Game

Big game species are probably the most well-known of the county's wildlife because they are highly visible and provide hunting opportunities. Elk, moose, mule deer, white-tailed deer, big horn sheep, and mountain goat comprise big game species and attract people outside the community who contribute to the local economy.

Most big game moves up and down the mountains in response to seasonal changes. Important habitats include mating and birthing areas, wallows, mineral licks, escape cover, seeps, wet meadows, and productive forage sites. However, winter range is the single most limiting factor in the lifecycles of big game. The amount and quality of winter range habitat largely determines the number and distribution of big game animals which will survive the winter. Big game have two major biological requirements which must be met on winter range: forage and thermal cover. Forage for elk and mule deer is generally found on lower elevation south-facing slopes where grasses and shrubs provide food. Scattered trees at the edges of forests often have snow-free areas around their trunks, even when the more open sites are buried in snow. Winter thermal cover is provided within forest stands adjacent to feeding areas. Such stands reduce wind velocities and resulting low chill factors and offer some insulation which keeps bedded animals warm. The winter habitat needs of moose and white-tailed deer are similar, although these animals tend to stay near river and creek corridors. Big horn sheep and mountain goats also seek lower elevation sites during winter. However, goats remain high in the mountains the entire year if no suitable winter range exists downslope.

Map 8 reveals substantial amounts of big game winter range found on private land in Missoula County. These habitats are vulnerable to development due to their low elevation, scenic amenities, proximity to access such as county or logging roads, and the unstable viability of agriculture. Although all big game animals tend to move away from roads, elk use of winter range and other habitats is generally most severely impacted by the presence of roads. Inadequate cover at the edges of openings also reduces elk useage.

Big game management is a significant issue on both public and private lands. The proposed Lolo National Forest Plan contains a policy of resolving big game and livestock grazing conflicts so that big game receive 100% of the forage required to meet their biological needs. The Montana Department of Fish, Wildlife and Parks has acquired winter range habitats in certain portions of the county. Elk is "the big game species of greatest public interest in the Lolo National Forest" (Lolo National Forest Plan). About 10,000 elk roam the Lolo Forest, and there are more in the Flathead Forest north of Seeley Lake.

Birds

Many species of birds of prey, or raptors, live in or migrate through the county, where they hunt for ground squirrels, mice, voles, gophers, fish, grouse, and smaller birds. Raptors believed to nest in the county include bald and golden eagle, prairie falcon, osprey, northern goshawk, turkey vulture, and harrier, red-tailed, Cooper's, Swainson's and possibly ferruginous hawk, kestrel, and screech, great-horned, northern saw-whet, long-eared, barred, great grey, and northern pigmy owls. These creatures have diverse habitat requirements. Important habitats include rock outcrops, cliffs, remote nesting and roosting trees, grassland and forest hunting grounds, old forest stands, and riparian ecosystems. Some raptors, such as kestrel, tolerate human proximity well. Others, such as bald eagles, are easily disturbed—particularly during the nesting season.

Much of the habitat of upland game birds is found on private land in the county. Habitat potential is generally greater than present distribution. Upland game birds consist of roughed, blue, spruce, and possibly sharp-tailed grouse, ringed-neck pheasant, grey or Hungarian partridge, white-tailed ptarmigan, and Merriam's turkey. Blue and spruce grouse are common in coniferous forests. Roughed grouse prefer lower forested mountains and benches. The plains-loving sharp-tails may possibly extend west as far as the grasslands of the upper Blackfoot River. Pheasants have been introduced into open farm country along the Bitterroot and Clark Fork rivers where they feed on grain, seeds, berries, and insects. Grey partridge occupy cultivated terrain along the Bitterroot, Clark Fork, and upper Blackfoot rivers. Ptarmigan occupy high country alpine and subalpine settings. Merriam's turkeys are found along river corridors, on benches, and within forests on lower mountain slopes.

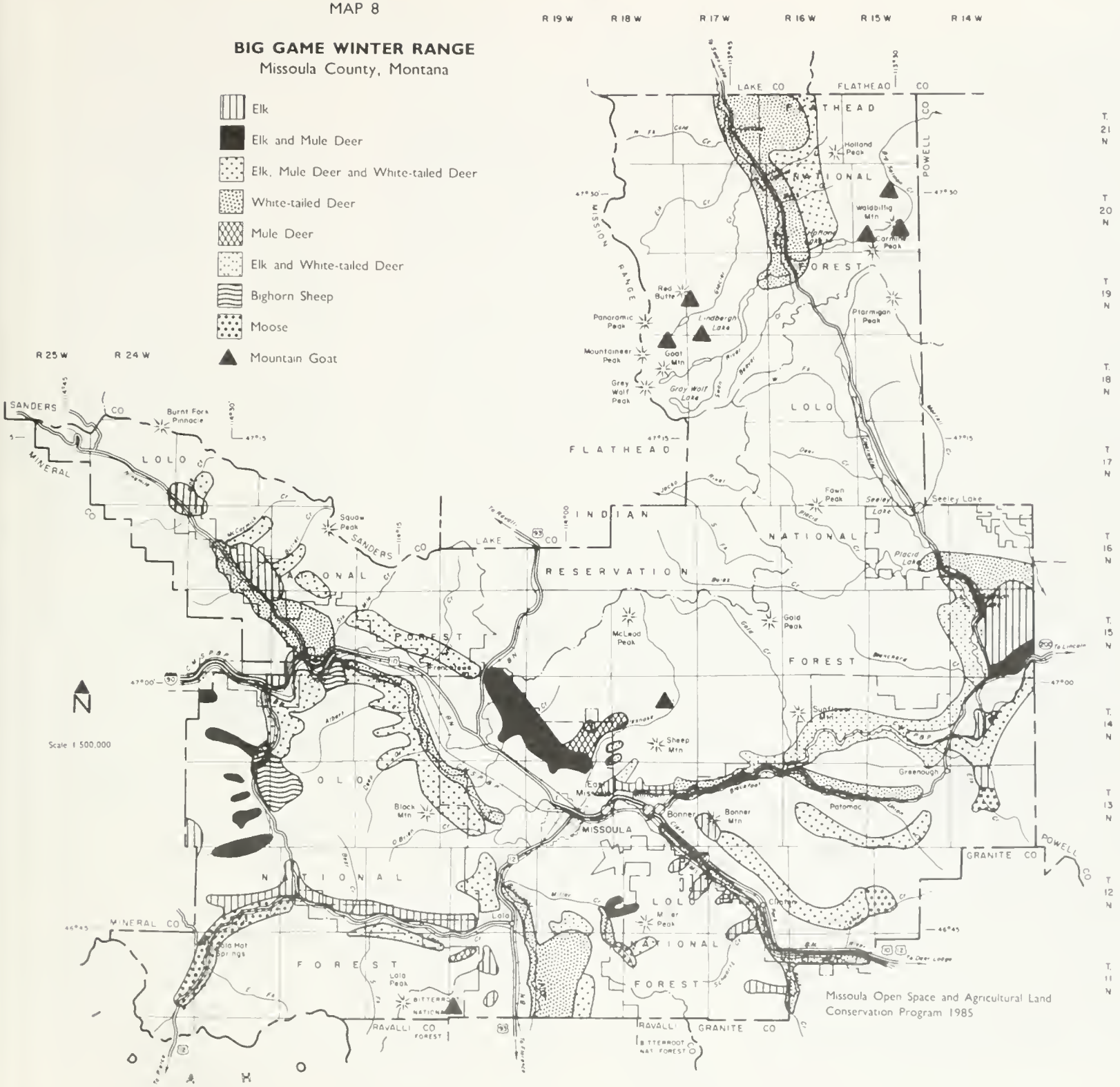
Missoula County lies in the Central Flyway and at the edge of the Pacific Flyway. These major waterfowl migration routes provide resting, feeding, and breeding habitat for many species of waterbirds. Canada geese and a variety of ducks both migrate through and breed in the county. Ducks include wood, mallard, pin-tail, cinnamon teal, northern shoveler, harlequin, Barrow's golden eye, and common merganser. Waterfowl which utilize the county's riparian ecosystems during spring and fall migrations include trumpeter swan, lesser snow goose, Ross' goose, American widgeon, gadwall, green-winged teal, lesser scaup, and bufflehead duck.

Lakes, rivers, creeks, and marshes are the principal habitats of waterfowl. This water/wetland pattern is virtually identical to recreation corridors shown on Map 5. Of particular importance are ice-free areas, such as spring-fed sloughs, spring creeks, areas below dams, riverbanks, and feeding grounds within two miles of water. The Fish and Wildlife Service has identified three "aquatic habitats of substantial benefit to waterfowl" in western Montana. One of these is the Swan River wetland complex. The Milltown Reservoir and Clark Fork River valley in the Frenchtown area are also important habitat for nesting and migrating waterbirds.

MAP 8

BIG GAME WINTER RANGE

Missoula County, Montana



Fish

Fish are, to the public, the most important component of riverine ecosystems. Some 30 fish species are found in the county and range from rainbow, brown, cutthroat, and bull trout to perch, whitefish, sculpins, bass, pumpkinseeds, and suckers. The Blackfoot and Jocko rivers and Rock Creek are rated Class I, or nationally-significant, fisheries. Ninemile, Rattlesnake, and other major tributaries are important spawning areas. Lakes have mixed fish populations due to stocking activities and diverse habitat conditions. Kokanee salmon are caught in several lakes in the Clearwater River watershed. Water pollution problems such as a heavy metal accumulations, siltation, nutrient enrichment, and de-watering are the principal threats to the county's fishery resource.

Species of Limited Distribution

Wildlife

The federal Endangered Species Act of 1973 provided legal protection for plants and animals listed by the U.S. Fish and Wildlife Service as threatened or endangered. The grizzly bear, bald eagle, gray wolf, and peregrine falcon have received this recognition.

A number of federal, state, and private agencies work to protect wildlife species which are threatened, endangered, or of special interest or concern. Because such species are vulnerable to disturbance, only general locations are shown on Map 9.

The grizzly bear is considered a nationally-threatened species. The Department of the Interior has not officially delineated critical habitat for the recovery of grizzly bear populations in Montana. In Missoula County, grizzly habitat includes the Seeley, Swan and Jocko valleys, and portions of the upper Rattlesnake Creek watershed. Detailed data on the precise number of grizzly bears in the county, their population structure, and movement is not available.

The endangered grey wolf is occasionally observed in the Seeley and Placid Lake area.

The endangered bald eagle nests and winters in the county. Five known nests exist along the Clark Fork, Bitterroot, Blackfoot, and Clearwater rivers. Eagles also winter within these same riparian areas. Bald eagles feed mostly on fish. One mile up and downstream of a nest is considered primary habitat. A one-half mile biological protection area around an active bald eagle nest is necessary to minimize disturbance during the nesting season.

The last peregrine falcons nested in Missoula County about 30 years ago in the Clark Fork river valley near Alberton. Their numbers declined sharply due to pesticide use, illegal killing, and illegal capture by falconers. Although their numbers are increasing and peregrines now migrate through the county, no nesting activity is taking place, despite the existence of suitable habitat for this endangered species.

The endangered wolverine lives in the coniferous forests of the Seeley-Swan region.

MDWFP has identified "Vertebrate Species of Special Interest or Concern" for Montana. Mammals on this list and found in Missoula County include fringed bat, California myotis (bat), Townsend's big-eared bat, hoary marmot, spotted skunk, fisher, wolverine, lynx, wolf, grizzly bear, and northern bog lemming. There is one amphibian (the Couer d'Alene salamander) and two fishes (the cutthroat trout and arctic grayling) which are also considered to be of special interest or concern. Birds recognized are osprey, bald eagle, Cooper's hawk, northern goshawk, ferruginous hawk, golden eagle, merlin, peregrine and prairie falcon, upland sandpiper, long-billed curlew, northern pigmy owl, burrowing owl, barred owl, great grey owl, northern saw-whet owl, pileated woodpecker, olive-sided fly catcher, western bluebird, clay-colored sparrow, Brewer's sparrow, and bobolink. All raptors are legally protected by federal or state law and the Convention on International Endangered Species (CITES).

Plants

No Montana plants have officially been listed as threatened or endangered by the federal government. Montana laws such as the Montana Environmental Policy Act and the Major Facilities Siting Act reveal the public's general concern for the protection of unique, fragile, or ecologically significant lands and species. Plants with limited distributions achieve public significance for many reasons. Certain plants are easily damaged by environmental changes and have value in monitoring the effects of pollution. Many have value as resources for medicinal, food, fiber, and gene pool purposes. Some members of the public believe that a plant's existence is the sole criteria of value.

Climatic, geological, and biological change combined with human uses have created a deceptively intricate flora in the county. Species of limited distribution, relict populations, unusual species relationships, and unique habitat types lie veiled behind the seemingly simple pattern of cottonwood groves, golden grasslands, green forests, and rocky summits.

The following lists of plants of limited distribution was drawn from a review of available literature, data from The Nature Conservancy, and interviews (see Table 2). Species with an asterisk (*) occur at sites shown on Map 9.

TABLE 2
Plants of Limited Distribution

Threatened	
*Three-leaved Foamflower	*Tiarella triofoliata var triloliata*
Adder's Tonge	*Ophioglossum vulgatum*
Oregon Bluebells	*Mertensia bella*
Endangered	
*Howell's Gumweed	*Grindelia howellii*
*Howellia	*Howellia aquatilis*
Rare	
*Poor Sedge	*Carex paupercula*
*Western Witchgrass	*Panicum occidentalis*
*White Glacier Lily	*Erythronium grandiflorum var candidum*
*Kittentail	*Syntheris canbyi*
Buckler Fern	*Dryopteris cristata*
Yellow Beardtongue	*Penstemon flavenscens*
Alpine Saxifrage	*Saxifraga tolmei var ledifolia*
Obscure Evening Primrose	*Camissonia andia*
Northern Bentgrass	*Agrostis borealis*
Pygmy Water Lily	*Nymphaea tetragona*
Water-shield	*Brasenia schreberi*
Coville's Rush	*Juncus covillei var obtusatus*
Pointed Broom Sedge	*Carex scoparia*
Endemic	
*Bittercress	*Cardamine rupicola*
*Missoula Phlox	*Phlox kelseyi var Missoulensis*
Believed Extinct	
Bitterroon Trisetum	*Trisetum orthochaetum*

MAP 9

SPECIES OF LIMITED DISTRIBUTION

Missoula County, Montana

Animals

1. Grizzly Bear - Nationally threatened

   Critical habitat and migration corridor

2. Grey Wolf - Nationally endangered
3. Bald Eagle - Nationally threatened

   Wintering areas

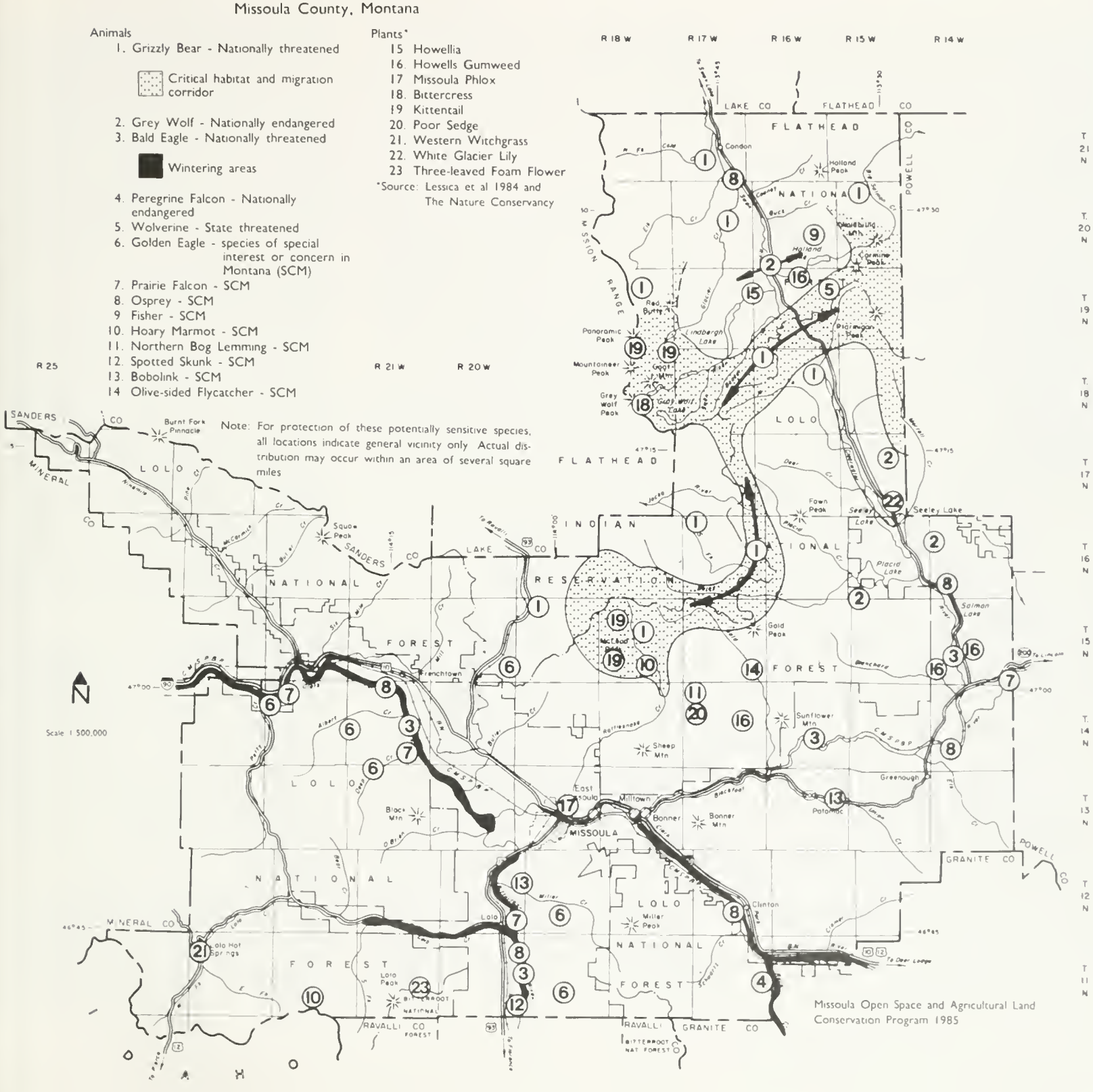
4. Peregrine Falcon - Nationally endangered
5. Wolverine - State threatened
6. Golden Eagle - species of special interest or concern in Montana (SCM)
7. Prairie Falcon - SCM
8. Osprey - SCM
9. Fisher - SCM
10. Hoary Marmot - SCM
11. Northern Bog Lemming - SCM
12. Spotted Skunk - SCM
13. Bobolink - SCM
14. Olive-sided Flycatcher - SCM

Plants*

15. Howellia
16. Howells Gumweed
17. Missoula Phlox
18. Bittercress
19. Kittentail
20. Poor Sedge
21. Western Witchgrass
22. White Glacier Lily
23. Three-leaved Foam Flower

*Source: Lessica et al 1984 and The Nature Conservancy

Note: For protection of these potentially sensitive species, all locations indicate general vicinity only. Actual distribution may occur within an area of several square miles



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Other species exist in the county within certain environments, but detailed site data were unavailable. The status of each plant follows recommendations by Lessica and others. These are: Threatened, Endangered, Rare, Endemic (found only in Montana), and Believed Extinct.

The National Park Service's inventory of potential ecological landmarks in the northern Rocky Mountains revealed eleven such areas in Missoula County (Johnson and Pfister). Sites ranked within this study contain species, geological features, or high quality habitat types of importance in conserving a complete system of representative ecosystems in the United States. The potential ecological landmarks in Missoula County are shown on Map 10. These are:

Blackfoot-Clearwater Game Range
Carlton Ridge
Council Groves
Fort Missoula Pine Bottomland Forests
Kelly Island
Lubrecht Forest sites
Mount Sentinal
Park Homestead
Plant Creek
Sheep Mountain Bog
Waterworks Hill

Other Significant Ecological Resources

The Forest Service has a system of Research Natural Areas (RNAs) around the country. RNAs consist of high quality representative habitat types which serve as scientific study areas. Land management practices can be more fully evaluated by studying RNAs as examples of intact habitats. The proposed Lolo Forest Plan recognizes three RNA objectives in Missoula County: Plant Creek, Sheep Mountain Bog, and Carlton Ridge (see Map 10).

Other areas of botanical importance are isolated western red cedar groves in Hayes and Deer creeks, white spruce/Englemann spruce hybrids in the Seeley-Swan region, Mary's Frog Pond botanical area, and high elevation prairies of Skookum Butte in the Lolo Creek drainage. The Nature Conservancy has classified black cottonwood bottomland forests as a "plant community of special concern." The location of these features is shown on Map 10. Explanation, where appropriate, occurs in the regional descriptions.

The Missoula County landscape contains numerous landforms and geological features of interest. Glacial canyons, moraines, faults, landslides, peaks, floodplains, foothills, and a wide variety of bedrock types are among its prominent aspects. Seven of the more widely-known features of the County were selected for recognition (see Map 10). These are:

Glacial Lake Missoula varved clay
Glacial Lake Missoula shorlines
Miocene-age fossil leaves
Lolo hotsprings/Idaho batholith
Cambrian-age fossil trilobites
Coloma sulphide ore
Pre-Cambrian-age ripple marked rocks

The riparian zone surrounds rivers, creeks, and lakes. These moist ecosystems are the single most important habitat type in Missoula County. Over 200 wildlife species are dependent upon riparian communities. Species such as osprey, bald eagle, great blue heron, spotted sandpiper, and most waterfowl are totally dependent on riparian corridors. For example, great blue heron nesting areas, or rookeries, are found in large cottonwood trees along the Bitterroot and Clark Fork rivers. Fish account for 90% of the diet of herons. Many other species, including big game, spend a great deal of time in bottomlands. Elk are estimated to spend as much as 40% of their time near water. Riparian areas attract big game because of cooler summer temperatures and natural migration routes. The presence of water in semi-arid valleys, the great habitat diversity along the edge of riparian lands and adjacent ecosystems, and the resulting high wildlife and vegetation productivity makes riverine and lakeside areas critical ecological resources.

Seeley-Swan

Forests of the Seeley-Swan Region are unlike those found throughout the rest of the county. This region lies at the border of maritime and continental climates and thus has a mixture of Pacific Coast and Intermountain Forest species. Pacific Coastal Forest trees such as western red cedar, grand fir, western hemlock, and western larch grow in the valleys, along with more familiar species such as Douglas fir, Englemann spruce, ponderosa pine, and lodgepole pine. The Pacific Coastal Forest habitat type once extended over most of western Montana but retreated northward with the warming climate. The Swan Valley wetland complex is ideal for Pacific Coast tree species. The Clearwater drainage is similar, although less moist. No natural grasslands exist in the region.

White-tailed deer winter range is found on Condon and Smith creeks and along the Swan River. The populas Swan Valley white-tailed herds winter in mature timber stands where snow depths are less than in adjacent timber harvest sites. Winter foods consist of Oregon grape, serviceberry, mountain maple, grasses, forbs, tender Douglas fir branches, and tree-grown lichens. About two-thirds of the Swan Valley white-tailed winter range is in private ownership. Some deer move across the Swan/Clearwater Divide to join other herds who winter on the ridge west of Salmon Lake and in the Blackfoot-Clearwater game range east of Salmon Lake. As many as 500 deer have been observed in a seven-square-mile area east of this lake. Elk and mule deer winter upslope and east of the Swan River. Mountain goats winter in or near the Mission-Swan ranges. Moose reside in riparian areas but may move into the mountains during warmer months.

The threatened grizzly bear is found throughout much of the region. This species was classified as "threatened" by the U.S. Fish and Wildlife Service in 1975 due to grizzlies' greatly reduced numbers and range. The Convention on International Trade and Endangered Species has also recognized the grizzly bear as a threatened species. CITES was established to eliminate the marketing of threatened species and their body parts. The present status of the grizzly bear in Montana is under debate between those who believe numbers are rising and range is expanding and those who either disagree or feel insufficient data exists to make a clear determination.

There are approximately 25 grizzly bears in the Mission Range, several hundred in the Bob Marshall complex, and approximately a dozen in the Seeley Lake vicinity. According to recent research, 40-70 animals are required to sustain a population without excessive inbreeding. Maintenance of a travel corridor for bears between the Mission and Swan ranges is viewed by biolo-

MAP 10

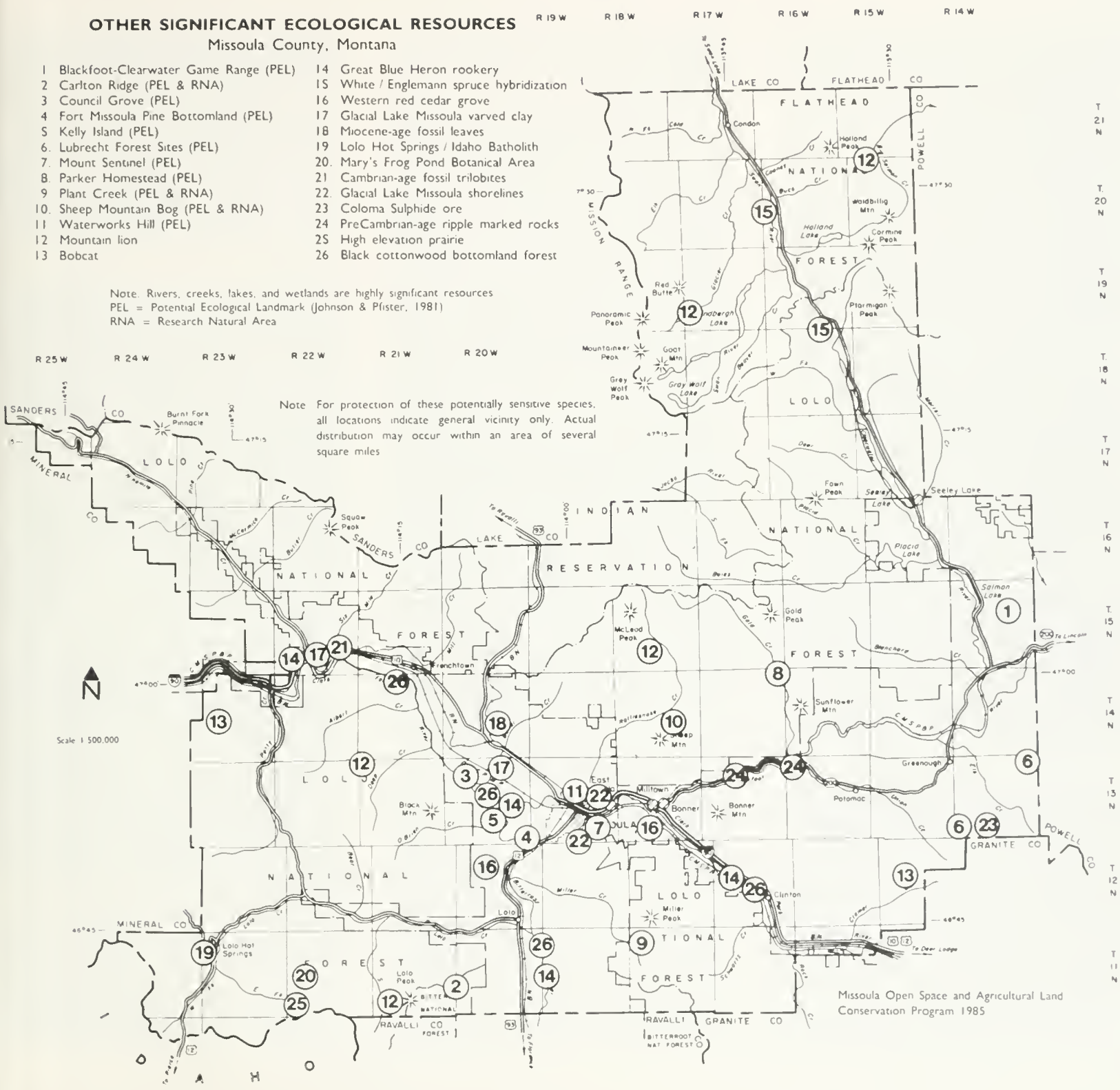
OTHER SIGNIFICANT ECOLOGICAL RESOURCES

Missoula County, Montana

1 Blackfoot-Clearwater Game Range (PEL)
2 Carlton Ridge (PEL & RNA)
3 Council Grove (PEL)
4 Fort Missoula Pine Bottomland (PEL)
5 Kelly Island (PEL)
6. Lubrecht Forest Sites (PEL)
7. Mount Sentinel (PEL)
8. Parker Homestead (PEL)
9 Plant Creek (PEL & RNA)
10. Sheep Mountain Bog (PEL & RNA)
11 Waterworks Hill (PEL)
12 Mountain lion
13 Bobcat
14 Great Blue Heron rookery
15 White / Englemann spruce hybridization
16 Western red cedar grove
17 Glacial Lake Missoula varved clay
18 Miocene-age fossil leaves
19 Lolo Hot Springs / Idaho Batholith
20. Mary's Frog Pond Botanical Area
21 Cambrian-age fossil trilobites
22. Glacial Lake Missoula shorelines
23 Coloma Sulphide ore
24 PreCambrian-age ripple marked rocks
25 High elevation prairie
26 Black cottonwood bottomland forest

Note. Rivers, creeks, lakes, and wetlands are highly significant resources
PEL = Potential Ecological Landmark (Johnson & Pfister, 1981)
RNA = Research Natural Area

Note For protection of these potentially sensitive species, all locations indicate general vicinity only. Actual distribution may occur within an area of several square miles



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gists as extremely important to allow for breeding between those two populations. The primary travel corridor used by grizzlies runs east-west along the Swan/Clearwater Divide (see Map 9). This corridor has been recognized in the Lolo Forest Plan as "land essential to the recovery of the grizzly bear." Several researchers believe continued availability of this corridor with its dense cover and riparian communities may be critical to ensure survival of grizzly bears in the Mission mountains. The Swan River riparian zone is used by grizzlies in the spring. Riparian corridors from the Missions to the river are key travel zones. Roads and recreation also tend to occur in valley bottoms. Since grizzlies develop a pattern of seasonal habitat use, a change in habitat availablility caused by land subdivision and home or road construction is usually detrimental to the bears. However, grizzly bears are not shy of people, as long as cover is available. Confrontations occur when grizzlies are attracted to dwellings by garbage, fruit trees, apiaries, poultry, swine, and other livestock, or processing of meat for human consumption. When individual animals come to rely on such foods, significant problems arise for both people and bears.

Four reliable sitings of the endangered gray wolf have occured in this region during the last ten years. Three of these sitings were in the vicinity of Seeley and Placid lakes. Another siting occurred between Holland and Lindbergh lakes, where biologists speculate many wolf travel corridors exist between the Mission and Swan ranges. Fishers reside in the forests of the Swan Valley. Seven animals from British Columbia were transplanted to the Holland Lake area in 1958. This transplant effort apparently has been successful. The state-endangered wolverine also roams these forests. Mountain lion, lynx, black bear, and numerous other mammals are found in this forest landscape.

The endangered bald eagle utilizes this region seasonally. An eagle nest may exist at Salmon Lake. Osprey also nest along the Clearwater and its chain of lakes.

The Clearwater River and its lakes has a mixed fishery of numerous species. Kokanee salmon are taken from the lakes. The Swan River fishery is characterized by cutthroat and bull (dolly varden) trout. The Swan River is a Class II fishery, and the Clearwater River is a Class III fishery.

Two plants in this region have been recommended for endangered status (Lessica and others). Howell's gumweed occurs in a moist meadow near Holland Lake. Howellia grows at the margins of shallow ponds and potholes just downstream of Lindbergh Lake. The rare white glacier lily grows in the forests surrounding Seeley Lake. Englemann spruce growing in this region's valley bottoms show cone characteristics and chemical composition akin to white spruce which is common to the north in Canada. Spruce hybrids of this region display similarities to both species.

Potomac-Greenough

Large numbers of elk winter in this essentially undeveloped region. The Blackfoot-Clearwater Game Range is the most heavily used expanse of elk winter range in the county. Approximately 400 to 500 elk utilize this area each year, although use varies with the severity of winters. Pockets of elk winter range also exist in the Greenough area. Numerous elk and white-tailed deer utilize winter range along the Blackfoot and Clearwater rivers. White-tailed deer winter range also exists in the open, south-facing pine forests north of Potomac. Mixed elk, mule deer, and white-tailed deer wintering areas are found in several portions of this region. Moose are year-round of the Elk Creek drainage.

Grizzly bears utilize upper Gold Creek as part of a travel corridor between the Rattlesnake and Mission Mountain wilderness areas. Two bald eagle nests exist on the Blackfoot River upstream of Johnsrud Park. Bald eagles have built huge stick nests there. Another nest is believed to occur just across the county line from Sperry Grade. An active nest is also found on the Clearwater River south of Salmon Lake. The Blackfoot and Clearwater watersheds are also frequented by transient eagles. During many years, winter use along the rivers is limited by ice. Osprey nest in tall snags along the Blackfoot upstream of Ninemile Prarie. Prairie falcon nest in ledges on bedrock cliffs near Sperry Grade. Peregrine falcons have been observed in this region, but historical nesting areas remain unused. Three other species of concern occur here. Bobolinks nest from June to mid-August in the tall grass of wet meadows near Potomac. Olive-sided flycatchers nest in tall snags which stand above new-growth forests or recent timber harvest areas in the Gold Creek watershed. Western bluebirds, a cavity nester, are utilizing boxes along the highway just north of Clearwater Junction. Sharp-tailed grouse may occupy grassland habitat in the Ninemile Prarie and Clearwater Junction areas. If verifiable, this would represent a significant extension westward of their range. Sharp-tails are known to occur further east near Ovando.

The Blackfoot River is a Class I fishery. Rainbow, brown, and bull trout are the most common species. MDFWP estimates fish populations between 1,000 and 1,500 per river mile. This makes the Blackfoot the most productive fishery in the county. Tributary streams are important for spawning. In 1979, the U.S. Army Corps of Engineers identified two places in Missoula County as potential dam sites. Both were on the Blackfoot River. A dam and storage reservoir were discussed for the Ninemile Prairie area with a re-regulation dam downstream at McNamara near Johnsrud Park. The status of these potential projects is unknown. At present, siltation is the principal threat to the Blackfoot River fishery.

Other ecological resources of interest are isolated western red cedar forests found in the Gold Creek watershed. The Coloma area contains diverse sulfide ores which once were mined for gold. At many sites along the Blackfoot River, maroon Pre-Cambrian-aged argellite rocks display remarkable features. These shale-like rocks originated a billion years ago on tidal mud flats. Ripple marks, mud cracks, and even raindrop imprints can be observed on exposed bedrock.

Clinton-Turah

White-tailed deer utilize riparian winter range habitats along the Clark Fork River. However, many of these deer share winter range with mule deer and elk along the lower south-facing slopes of the Garnet Range. Elk wintering areas occur at Bonner Mountain and in Crystal, Allen, Greenough, Schwartz, and Gilbert creeks. Moose find winter habitats along Cramer Creek. Big horn sheep winter in the Babcock Mountain area of lower Rock Creek.

Bald eagle winter along the Clark Fork and Rock Creek, but no nests are known to exist there. There have been documented sitings of peregrine falcons along lower Rock Creek. A small great blue heron rookery exists on the river near Clinton. Extensive black cottonwood bottomland forests parallel the Clark Fork throughout this region. This forest type has been identified by The Nature Conservancy as a "plant community of special concern." Bobcats are known to reside in the Cramer Creek watershed.

The Clark Fork River is a Class II fishery consisting primarily of brown and rainbow trout. Upstream of Rock Creek, the river has low productivity for game fish. Biologists suspect that, for many years, heavy metals from industrial operations in Anaconda accumulated in this stretch of river. Sedimentation and irrigation withdrawals are also suspected of impacting fishery production. Rock Creek adds substantial clean water to the Clark Fork. This Class I creek contains about 1,000 fish per mile. Although rainbown trout are most common, lesser numbers of cutthroat, brook, brown, and bull trout exist. Downstream of Rock Creek, the Clark Fork fishery improves enough to support about 400 fish per mile.

Evaro

Elk and mule deer winter range exists in the lower portions of the Jocko River drainage. Some white-tailed deer winter along Finley Creek in adjacent lower elevation forests.

The upper Jocko River watershed contains terrain identified by wildlife biologists as important grizzly

bear habitat. Bears have been increasingly observed near Evaro. Conflicts with livestock producers and other private landowners have been reported. Some researchers speculate that grizzlies may travel west of Evaro. Others believe that Reservation Divide lacks sufficient habitat to sustain bears year-round.

Golden eagles nest southeast of Evaro. Eyries are located in a variety of settings ranging from cliffs to tall trees and even utility poles.

The Jocko River is a Class I fishery which sustains "planted" rainbows with a scattering of cutthroat, brown, brook, and bull trout.

Missoula Valley

This region contains substantial and varied big game winter range habitats. Elk winter range exists in the Mount Jumbo/Woody Mountain area. Strawberry Ridge and adjacent lands of the Rattlsnake Creek drainage are highly important mule deer wintering areas. White-tailed deer winter in riparian habitat along the Clark Fork and Bitterroot rivers and are also making extensive use of lower benches and mountain slopes. Miller Creek has large wintering populations of whitetails which are extensively preyed upon by coyotes. In the winter, the diet of coyotes shifts from rodents to deer as snowpack deepens. White-tailed populations in the Miller Creek area declined from 1965 to 1977 due to increased subdivision and hunting. Trends since that time are unknown. Moose wintering in this drainage may also be preyed upon by coyotes. Elk and mule deer share winter range on south-facing benches in the lower mountains in the O'Keefe, Butler, and Grant Creek watersheds. Elk, mule deer, and white-tailed deer winter in the lower forested areas from O'Brien Creek to Harper's Bridge. Mountain goats spend winter months on sunny slopes near High Fall's Creek in the Rattlesnake National Recreation Area (RNRAW).

Grizzly bears are year-round residents of RNRAW, and denning is occurring in the wilderness area. Bears move west to Evaro on occasion but more commonly utilize the Jocko Divide as a travel corridor to the Mission Mountains and Seeley-Swan region. Bald eagles winter on the Clark Fork and Bitterroot rivers.

A great blue heron rookery exists in vicinity of Kelly Island. Herons require large cottonwoods in which to nest. Preferred sites are adjacent to slow-moving sloughs which remain clear and provide excellent fishing when the main river is muddy during peak flows. Rookeries tend to be abandoned every five to fifteen years. The trend in the county is for smaller, and perhaps more numerous, rookeries. If bald eagle nests become established in the region, they may occur in the same habitats as heron rookeries.

The Five Valleys Audubon Society's inventory of birds of the upper Rattlesnake watershed discovered 85 species from April to December. Harrier, screech and barred owls, pileated woodpecker, and golden eagle are among the birds nesting in the drainage. Sandhill cranes have been seen in Spring Gulch. Biologists also have discovered hoary marmots on Wrangle Creek and northern bog lemmings in Shoo Fly Meadows. This is believed to be one of the southern-most populations of northern bog lemmings in the United States.

Bobolinks nest in tall meadow grass in lower Miller Creek, one of only two nesting areas in the county. Golden eagles nest south of the creek. Merlin are fall migrants and winter residents of the region and have been observed hunting waxwings in the City of Missoula. Golden eagles nest in the Miller Creek watershed. Long-billed curlew are occasional spring migrants and have been seen in short-grass steppes on Waterworks Hill and near the airport. Pileated woodpeckers nest in tree cavities of ponderosa pine and Douglas fir forests and winter in riparian cottonwood forests. Pileateds are observed often in the lower Rattlesnake during winter months.

The Clark Fork River downstream of Bonner Dam is predominantly a rainbow trout fishery. Populations are low, with only 250-300 fish per mile. Productivity of the fishery is believed to be reduced by municipal sewer discharges, sediment, river channelization, and industrial discharges of heavy metals. A team of hydrologists and geologists recently concluded the pollution of drinking water in Bonner was caused by accumulations of heavy metals such as arsenic, zinc, manganese, and iron in the sediments of Milltown Reservoir. These metals are believed to have entered the river via Warm Springs Creek in Anaconda. Heavy metals are swept downstream in the Clark Fork during peak flows and during reservoir drawdowns. The Bitterroot River contains mostly rainbow with smaller numbers of brown and cutthroat trout. Mountain whitefish are also plentiful. Both the Bitterroot and the Clark Fork rivers are rated Class II streams.

Waterworks Hill, located just north of the city, is a unique habitat. The ridge lies in the direct path of intense winter winds which are funnelled through Hellgate Canyon. Snow is swept off the hill, and the rocky soils become extremely dry. The resulting vegetation resembles an alpine area with low-growing plants such as mountain douglasia, cushion buckwheat, and Missoula phlox. This white-petaled variety of phlox was once thought to grow only on Waterworks Hills, but is now known to occur in patchy distribution as far east as Meagher County. Missoula phlox is not known to exist outside Montana. The rare poor sedge grows in boggy conditions in the Rattlesnake watershed.

Six potential ecological landmarks exist in the Missoula Valley Region (see Map 10). Waterworks Hill is known for its unusual flora. The Fort Missoula pine bottomland forest, Kelly Island, and Council Grove sites contain excellent examples of black cottonwood and ponderosa pine riparian forests and excellent wildlife habitats. Mount Sentinel is known primarily for its prairie grassland vegetation, providing excellent opportunities for studies of fire ecology. The Plant Creek site contains spruce and Douglas fir forest habitat types and groves of 300-year-old western larch. Plant Creek also is a possible Forest Service Research Natural Area.

Remnants of Pacific Coastal Forest habitat types from a cooler, wetter climate exist around Missoula. Stands of western red cedar, grand fir, western white pine, and western larch exist in Holloman, Hayes, Deer, and to some extent, Plant creeks. Pattee Canyon contains stands of 400-500-year-old ponderosa pine. The oldest known ponderosa pine in western Montana has lived 730 years in what is now Glacier National Park. The stump of a pine cut in Pattee Canyon in 1900 had 707 rings, and thus began its growth in the year 1093, some eighteen years prior to the Magna Carta.

During the Ice Age, Glacial Lake Missoula intermittently filled most of the valleys throughout the county. Mount Sentinel and Mount Jumbo have approximately 35 ancient shorelines of Glacial Lake Missoula etched on their west slopes. As the lake repeatedly drained and filled thousands of years ago, westerly winds sent waves into the mountain sides, and shorelines were eroded into the bedrock at various elevations. These features are most easily seen in the spring when snow lies in horizontal lines on the old "beaches." For centuries, pinkish clay and silt settled to the bottom of Glacial Lake Missoula in layers. These "varved" sediments, laid down as dark winter bands and light summer bands, are useful in geological dating. Excellent remnants of lake varves occur at the airport and along I-90 west of Huson in the Frenchtown-Huson Region. About 15-20 million years ago, during the Miocene Age, a forest of hardwood trees (maple, oak, ash) grew in the Missoula area. Fossil leaf imprints exist in shaley rock found along a railroad cut near O'Keefe Creek.

Lolo

Substantial numbers of elk winter on the south-facing grasslands and forests above Lolo Creek. Moose winter range exists in the upper portion of the watershed. White-tailed deer make use of riparian winter range along the Bitterroot River and Lolo Creek, but the most intensively used areas occur on eastside benches from Davis Creek south to the county line. Baldy Mountain is a key mixed big game wintering area. Mountain goats utilize south-facing slopes at mid-elevations above Carlton Creek.

Bald eagles winter along the Bitterroot River and Lolo Creek and are observed year-round. An active nest exists near the river. Species of special interest or con-

cern include nesting osprey, prairie falcon, Cooper's hawk, and long-eared owl along the Bitterroot River, nesting golden eagles near Baldy Mountain, spotted skunk in the Bitterroot River floodplain, and hoary marmot in the Dick Creek area. Townsend's big-eared bat and California myotis are believed to exist along the benches west of the river. These nocturnal bats prefer caves and mine shaft roosting areas. The rare Coeur d'Alene salamander may exist in the upper Lolo Creek area.

The Bitterroot River and Lolo Creek are both Class II fisheries. The Bitterroot is known mostly for rainbow with smaller amounts of brown and cutthroat trout. Mountain whitefish are becoming increasingly popular as a game fish.

The threatened three-leaved foamflower grows in remote subalpine forests along Carlton Ridge. Rare western witch grass is found near Lolo Hot Springs. Bitterroot trisetum once grew near the hot springs but is now believed extinct.

A site on Carlton Ridge along the border of the Selway-Bitterroot Wilderness area has been recognized by the federal government, both as a nationally-significant potential ecological landmark, and as a possible Research Natural Area. Unusual alpine larch forests grow on broad, gentle slopes. Hybridization between alpine and western larch may be occurring. The area is also important for pristine examples of numerous subalpine fir habitat types. Hoary marmot may also occur here.

Other important ecological areas in the region include a great blue heron rookery, excellent black cottonwood forests along the Bitterroot River, high elevation prairies on Skookum Butte, the Lolo Hot Springs/Idaho batholith geological features, and Mary's Frog Pond botanical area. Mary's Frog Pond, in the Lolo Creek drainage, has been used by botanists who analyze peat deposits for ancient pollen. The pollen, which settled to the bottom of the lake over thousands of years, accumulated in layers which are useful in reconstructing the vegetation patterns and climatic cycles of the past.

Frenchtown-Huson

White-tailed deer make some use of the Clark Fork floodplain during winter months. However, white-tails, mule deer, and elk tend to winter in lower forested mountains southwest of the river and in foothills north of Frenchtown. Substantial numbers of elk and mule deer utilize winter range in the Petty Creek drainage. In the past, elk were transplanted into the Sixmile area. The Frenchtown-Huson region contains the only big horn sheep herds in the county. Some occasional big horn use may occur in lower Rock Creek. Approximately 60 head are found in the mountains west of the Clark Fork River. Two major winter concentration areas are found near Petty Mountain and Frenchtown Gulch. Big horns may be found on winter range from Petty Creek east to Deep Creek.

A bald eagle nest is located along the Clark Fork River downstream of Harper's Bridge. Eagles winter along the river. Osprey nest in the same area. Golden eagles are year-round residents of the Grave Creek range and near the Petty Creek/Clark Fork River confluence. Prairie falcon are nesting near Harper's Bridge. Falcon eyries are generally located on remote south-and east-facing cliffs overlooking grassland hunting grounds. Falcons are extremely intolerant of human disturbance during nesting. As recently as the mid-1950s, peregrine falcons nested in the cliffs along the Clark Fork upstream of Alberton. Such historical use areas are possible sites for re-introduction of peregrines.

The Class II Clark Fork River fishery is dominated by rainbow trout. Productivity is low to moderate. Occasionally, waste water discharges from the pulp mill decrease river water clarity. However, by the time water reaches Alberton, the river is generally clear. Impacts of waste water in the Clark Fork River are currently being monitored by Champion International Corporation and the State of Montana.

Other ecological resources of note include black cottonwood forests along the Clark Fork, a great blue heron rookery near Ninemile Creek, bobcats in the Petty Creek watershed, Glacial Lake Missoula sediments in an I-90 roadcut west of Huson, and Cambrian-aged fossil trilobites in a railroad cut in lower Sixmile Creek.

Ninemile

Numerous white-tailed deer utilize winter range along Ninemile Creek and adjacent lower mountain slopes. Elk and mule deer winter on south-facing slopes near Butler and Pine creeks. Approximately 80 elk winter in the area.

Bald eagles are known to visit the region during the winter, but most spend the season along the Clark Fork. Herons are frequently observed. Various raptor species migrate through or nest in the region.

Ninemile Creek is a Class III fishery used extensively as a spawning area by trout moving out of the Clark Fork River.

The value of conserving agricultural land in Missoula County is three-fold. First, agriculture has economic importance. As a locally important industry, it generates approximately $8,000,000 annually. Second, agricultural lands which contain the most productive soils are considered important for long-term food and fiber production. Finally, as agriculture is a major land use in the county, loss of a farm or ranch often means loss of open space, wildlife habitat, recreation opportunities, and a way a life. Retention of agricultural landscapes which remain relatively intact is the most cost-effective way of conserving a variety of resources.

The agricultural land/conservation issue is much debated. Forests, ranges, and wetlands are being converted to farmland, while existing highly productive agricultural lands are subdivided and developed. With no national net loss of farmland, with rising production, with surpluses, and falling food costs, many argue there is no need to conserve farmland. Others indicate the conversion of marginal land for crop production carries with it substantial impacts, such as loss of wetlands and riparian forests, increased fertilizer/biocide expenses and impacts, reduced wildlife habitat, and increased soil erosion and siltation problems.

In 1981, this debate spurred passage of the National Farmland Protection Policy Act. This was the first Congressional recognition of the trend of conversions of agricultural land to non-farm uses. This bill was passed, in part, due to information contained in the National Agricultural Lands Study (NALS). This study determined the extent of farmland conversions and their environmental and financial impacts. NALS also showed how programs sponsored by the federal government often contribute to loss of agricultural land.

Implementation of the Farmland Protection Policy Act required a nationwide system to evaluate farmland quality. The information generated was to be used in thousands of federal decisions which might affect agricultural land. These include highway construction, water development projects, mining and energy development, recreation, and home loan procedures. The Land Evaluation and Site Assessment (LESA) was developed by the Soil Conservation Service to assist this process. LESA helps determine long-term agricultural value of a particular piece of land. LESA considers current land use plans and maps, zoning, utility service patterns, adequacy of local services, commodity shipping and processing facilities, distance to nearest non-farm land uses, growth trends, soil characteristics such as long-term productivity, availability of irrigation water, growing season, erodability, and other factors unique to the site (Steiner, et al.). The Missoula County SCS office is scheduled to prepare a LESA analysis for Missoula County. The data in this report will be of some assistance in compiling the LESA analysis.

Agricultural land uses are generally compatible with maintenance of most conservation resources. However, economic returns from agricultural operations are declining. Also, the market value of land for non-agricultural uses, such as subdivision and development, has long been greater than its value for agricultural use. The resulting pressure is intense to convert farmland to uses incompatible with conservation of natural and cultural resources. As a result, much of the county's productive farmland is already developed for non-farm purposes or is subdivided into tracts of 20 acres or less. Some subdivided land has remained in agricultural use, as an interim measure. Only a few unsubdivided, large farms and ranches remain. In most areas, it is no longer a question of "Will the county's farms and ranches be subdivided and developed?" but rather "How will they be developed?"

Ownership of Agricultural Land

Agriculture is a major private land use in Missoula County. Of the 1.67 million acres in the county, 944,000 (56%) are privately owned. One-half of that land is held by large timber management companies or is Confederated Salish-Kootenai tribal land. Of the remaining 26% (434,000 acres), two-thirds (284,000 acres) are in some form of agricultural use. An additional 275,000 acres of public and corporate lands are leased by county ranchers for grazing.

Forests cover the majority of Missoula County's landscape. Trees are the most important "crop" to the local economy. The management of commercial forests for timber production occurs on public as well as on corporate and other private lands. Commercial forests tend to be located at low to moderate elevations. Forests in the upper mountain slopes are usually either inaccessible, of low productivity, or legislatively protected from harvest.

The privately-owned, non-corporate landscape of Missoula County is undergoing a rapid transition from a rural, agricultural scene to an urban, suburban, and recreational one. While about 20% of the county's prime and important agricultural soils have been put to non-farm uses, the total amount of agricultural land has, by some estimates, increased (Montana Department of Administration). This situation mirrors national trends where net cropland acreage figures are holding steady or increasing despite urbanization of substantial amounts of farmland each year. However, unlike the country as a whole, agricultural production in Missoula County has declined markedly over the years, due to conversion of less productive soils into agricultural land.

Significant County Trends

Compared to the economy of other Montana counties, Missoula County does not significantly benefit from agricultural production. Over the last seven years, the county ranked 52nd of Montana's 56 counties in total agricultural receipts. Hay production usually ranks about 24th but varies year to year. Livestock and livestock products account for at least 70% of total county agricultural receipts. *The Missoula County Agricultural Protection Study* found less than one percent of the county's total net income was derived from raising livestock and crops.

This same study reported that, since 1950, nearly every facet of county agricultural production has declined (see Table 3). Production figures on Table 1 for hay, barley, and cattle vary from year to year. For example, in 1983 the County ASCS office calculated that 3,162 acres were planted into barley. This is more than a 50% increase from 1979. However, hay and grain rotations are a common agricultural practice which causes cyclic changes in the hay to grain ration. Overall the trends illustrated are accurate and significant (Missoula County Extension Office). *The Missoula County Agricultural Protection Study* indicated low prices for products, rising costs for production, high interest rates, increasing taxes, periods when a "strong dollar" reduces export potential, increased interstate competition, lack of local markets, and increased costs of farmland were among the principal reasons for the decline in the importance of agriculture in Missoula County. Some ranchers, faced with continuing poor economic conditions and an intolerable ratio of debt to income, have sold their property for non-farm purposes. Others have sold simply due to the attractive profit for non-farm purposes.

Farm Size

Statewide, farm numbers have been decreasing and farm sizes increasing steadily since 1950. This trend probably reflects agglomeration of small farm units into larger, more economically feasible units, since the establishment of 160-acre homesteads in the late 1800s. Missoula County seems to have followed this trend until the late 1960s. Average county farm size increased about 215% from 482 acres in 1950 to 1,038 acres in 1969. However, since 1969, there has been a steady decrease in average size and substantial growth in the number of farms. A small farm is considered to be less than 500 acres, but major growth has occurred in the number of farms between 10 and 49 acres.

TABLE 3

Missoula County Agricultural Production

Category	1950	1979
Cattle and calves	13,900	11,900
Dairy cattle	2,500	200
Hogs	3,200	500
Sheep	4,800 (1961)	300
Hay (acres harvested)	22,400	23,100
Wheat (acres harvested)	12,000	2,100
Barley (acres havested)	6,000	2,000
Oats (acres harvested)	4,200	600
Beets (acres harvested)	1,065 (1965)	0
Potatoes (acres harvested)	245	0

Source: *Agricutural Trends in Missoula County, 1950-1979.* Missoula County Extension Office, 1980.

Production Economics

A review of agricultural production sales for Missoula County between 1974 and 1978 (Missoula County Profile, Montana Department of Agriculture) provides additional information about the small farm growth trend in the county. While total farm income increased slightly for the four-year period, the number of farms reporting income in the range of $2,500 to $10,000 nearly doubled. The number of farms increased for all income groups, exeept those reporting income of between $20,000 and $39,999, which dropped almost one-third in number. In 1978, 285 of 385 farms in the county produced less than $10,000 from agricultural operations. 166 of those farms produced less than $2,500. 218 farm operators produced income of more than $2,500, of which only 47% listed farming as their principal occupations. About three of every four farms in 1978 were operated by persons who were primarily employed in non-farm occupations and worked away from their farms to supplement their incomes.

Uses of the County's Agricultural Land

Of the remaining agricultural land, irrigated and irrigable croplands are the economic cornerstone of farm operations in the county. Cow-calf production on integrated cropland/range units and mixed livestock and grain operations are the most common types of agricultural enterprises. At least two dairy operations exist. Cropland located on valley bottoms, benchlands, and foothills produces winter forage and cash crops vital to agricultural landowners. The availability of irrigation water for crop production is of primary importance to farm operations due to limited percipitation and the enhanced productivity of irrigated land. Irrigated crop-

land acreage varies by as much as four to five thousand acres per year. A 1959 peak of 36,630 irrigated acres is nearly twice the current average of 20,000 acres. Irrigated cropland accounts for about 70% of all harvested acres. Subdivision has occurred on some lands which were formerly cropped. To make up for cropland loss to development, agricultural landowners have put formerly untilled lands into production. Some of these lands are of lesser productivity, contain sensitive wildlife habitats, and/or are more susceptible to erosion. The loss of highly productive irrigated and irrigable croplands to residential subdivision and other non-farm uses removes the foundation on which viable ranching, and therefore, the agricultural landscape depends.

Hay is the most abundant crop grown locally. Some operators grow sufficient crops to sell hay to others. Hay can be raised for about $40 per ton and purchased for about $80 per ton, or more, during winters following drought like the county experienced in 1985. Operators feel they must produce at least 50% of their hay on-farm or face unmanageable expenses for winter forage. Valley bottom hay fields are also important because they provide winter shelter and calving areas. Hay and grain are grown alternately in crop rotations on many fields. This helps maintain good soil quality and reduces the potential for damage to hay crops by fungus. Most hay is an alfalfa/grass mixture. "Wild" hay is found in the higher valleys.

Wheat, barley, and oats are the most common grains produced in the county. In 1959, grain was harvested from nearly 23,000 acres. In the 1980s, the number of acres used to produce grain crops varies between 3,000 and 5,000 acres. Some grain is sold at market, and some types, such as awnless oats, are cut and fed to livestock.

Rangeland is an important component of the county's agricultural operation outside the urban influence of Missoula Valley. The availability of spring grass and the lease of public and corporate rangeland are of critical importance. Few farmers and ranchers have enough pasture on their property. Agricultural uses are increasingly in competition with other uses of mountain land, such as wildlife habitat, timber harvest, and recreation.

Soils

The Missoula Conservation District, in conjunction with the Soil Conservation Service, has evaluated the agricultural productivity of all soils found in the county (Missoula County Conservation District). The three classes which were identified are prime soils (if irrigated), soils of statewide importance (if irrigated), and soils of local importance (see Table 4). Specific characteristics of a soil, such as chemical makeup, depth, productivity, and slope steepness were used by the SCS in determining the eligibility of soils for each class. Prime soil has the best soil quality, growing season, irrigability, and other characteristics needed to economically produce sustained yield of crops when treated and managed according to generally acceptable farming methods. Soils of statewide importance have good soil quality but are somewhat less productive than prime land. Soils nominated locally important are in productive agricultural use, but have insufficient soil characteristics to warrant placement in a higher category and have been tentatively identified as important by the Missoula Conservation District. This classification reflects the Montana perspective on what is "prime" and does not compare Montana soil with the highly fertile and productive soils found in the humid Midwest. Some soils have changed class since preparation of the Missoula Conservation District materials. The following data and Map 11 reflect current classifications.

The pattern of prime and important agricultural land is shown on Map 11. Also mapped by the SCS were areas considered to be "urban and built-up land." These areas are densely developed and average one or more structures per 1.5 acres. Almost all urban and built-up areas formerly were in agricultural production. Many such areas are underlain by prime or important soils.

The floodplains and adjacent subirrigated land around rivers and large creeks in the county are extensively used as hayfields, pastures, and calving and wintering areas. Due to infertile, gravelly soils and alternately wet and droughty conditions, these areas are not shown on Map 11. However, their location along principal sources of irrigation water makes them critical segments of many agricultural operations.

TABLE 4
Prime and Important Farmland Soils

Prime Farmland
Alberton very find sandy loam, 0 to 2 percent slopes
DeSmet loan, 0 to 2 percent lopes
Grantsdale loam, 0 to 2 percent slopes
Big Arm gravelly loam, 0 to 4 percent slopes

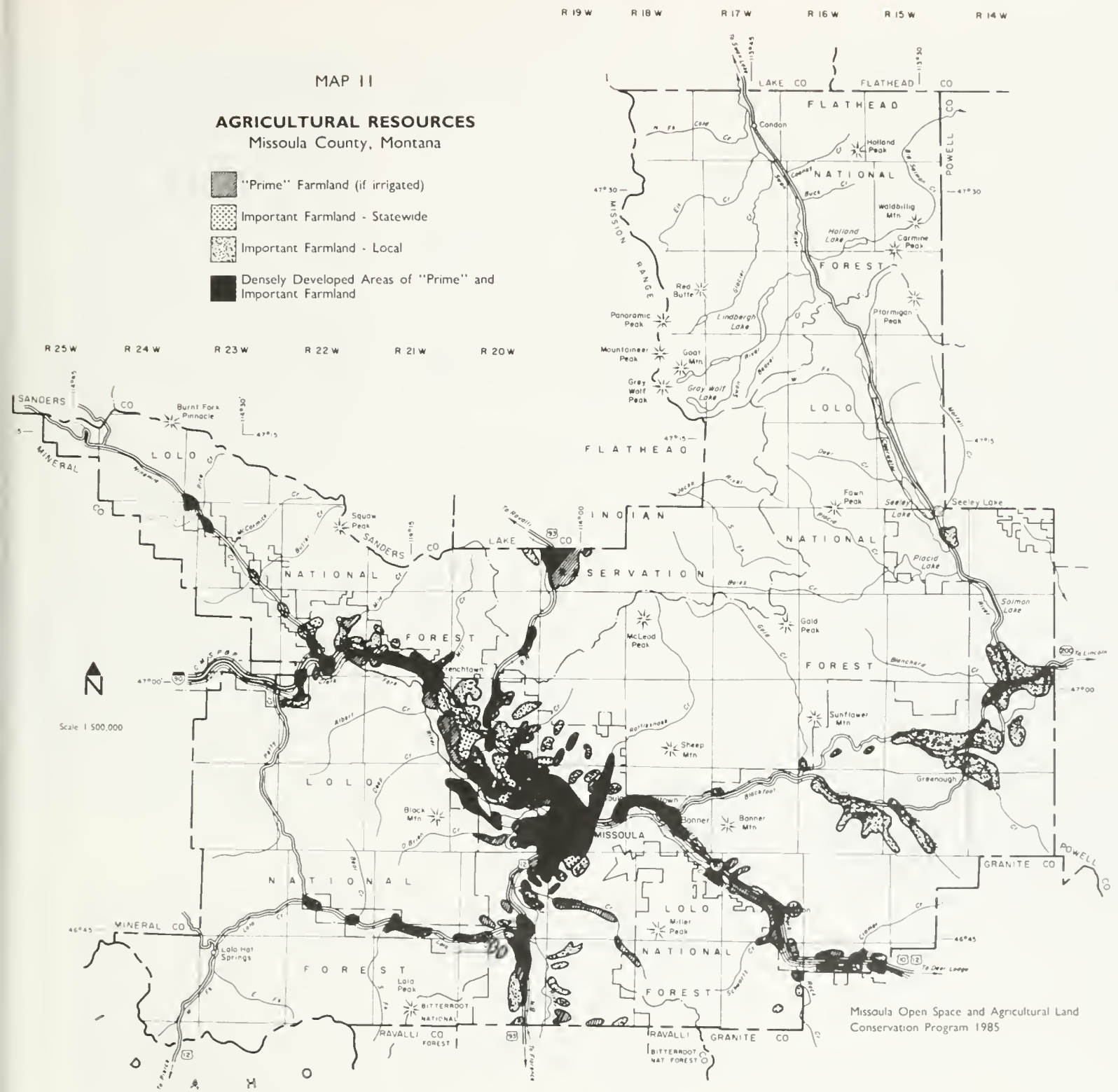
Farmland Soils of Statewide Importance
Argiborolls-Haploborolls, 0 to 4 percent slopes
Grass Valley silt clay, 0 to 4 percent slopes
Grass Valley silt clay, 4 to 8 percent slopes

Farmland Soils of Local Importance
Argiborolls-Haploborolls, 8 to 15 percent slopes
Big Arm gravelly loam, 4 to 15 percent slopes
Big Arm Variant gravelly sandy loam, 8 to 15 percent slopes
Grasssvalley silt clay loam, 8 to 15 percent slopes
Greenough silt loam, 4 to 15 percent slopes
Halfmoon silt loam, 4 to 8 percent slopes
Hanaker silt loam, 0 to 6 percent slopes
Missoula loam, 4 to 15 percent slopes
Moiese gravelly loam, 4 to 15 percent slopes
Tally Variant coarse sandy loam, 0 to 4 percent slopes
Turah silt clay loam, 0 to 2 percent slopes

MAP 11

AGRICULTURAL RESOURCES

Missoula County, Montana



Agricultural Land, Subdivision, and Conservation

Missoula County has 25,954 acres of prime farmland. Of this, 5,535 acres are presently considered to be urban and built-up lands. In other words, over 20% of the county's best soil is no longer available for agricultural uses. Farmland of statewide importance covers 10,107 acres of which 1,280 or 13% is urban and built-up land. Locally important farmland covers approximately 35,000 acres with an undetermined amount urbanized. Substantial agricultural lands have also been subdivided or are on the market for that purpose. The 1980 Environmental Information Center inventory of subdivision in Missoula County estimated 48% of prime land and 33% of land of statewide importance was subdivided.

Historically, the integration of publically significant conservation resources on private lands has produced relationships which have not been wholly positive between landowners and wildlife and recreation managers. As public demand for enjoyment of private land increases, opportunities for conflict also escalate. Hunter access and policing, stream access, lack of concern regarding weed control, and lack of continuity in public agency policies and management practices are often cited by agricultural landowners as sore spots.

The price of agricultural land no longer reflects its productivity for crops or forage but rather its value for non-agricultural use. Agricultural landowners view the sale of their land for non-farm purposes as the only way to recapitalize after years of work. Therefore, regulations aimed at restricting the sale of such lands for non-farm purposes may be perceived as a severe threat to borrowing power. Farmers, ranchers, and rural residents react strongly against the word "preservation" when it is applied to their land or livelihood. The majority of non-corporately owned agricultural land in Missoula County is controlled by fewer than 400 landowners. This means there is a voting majority of urban residents in the county who have the capacity to inadvertantly ignore the needs of agricultural landowners and encourage the recent trend of reduction in average farm size. The general public tends to discover too late the loss of public values which currently coexist with traditional agricultural land use. By the time subdivision trends are visible on the land, the loss of conservation resources is irreversible.

Seeley-Swan

The agricultural land use pattern in this area is distinguished by small ownerships and the absence of irrigated cropland. Agricultural use is limited by a short frost-free season and deep winter and spring snowpacks. The glacial soils found here are not highly fertile. No prime or important statewide farmland exists. A small quantity of locally important farmland is located south of Seeley Lake. Many small, non-corporate private land and agricultural land uses are centered along the Swan and Clearwater Rivers. Agricultural productions consists primarily of cattle and horses. Hay crops and pasture consist of "wild" hay. No alfalfa is planted. Corporate and public land is leased as summer pasture and provides woodland grazing. No grain crops are grown due to an abbreviated growing season. Pigs have been raised in places, and operators have experienced periodic problems with grizzly bears. Timber harvest is often used to supplement farm income.

Potomac-Greenough

This region contains some of the largest farms and ranches in Missoula County. Valleys at Clearwater Junction, Ninemile Prairie-Greenough, and Potomac contain nearly all the region's agricultural operations. Substantial quantities of locally important farmland mantle the gentler slopes. Soils considered to be prime and of statewide importance exist in the Ninemile Prairie-Greenough area and other portions of the region. However, due to a short frost-free season, no farmland is officially classified as prime or of statewide importance. Cow-calf operations predominate, and small grains are grown in the Ninemile Prairie area. Irrigated and subirrigated hay lands allow operators to be self-sufficient in winter forage production during most years. Alfalfa hay suffers winter kill at times. Both irrigated and dryland grains are raised. Federal, state, and corporate forest lands serve as vital summer pastures from June through October. Farms and ranches are increasingly subdivided and sold. Absentee owners are becoming more common with ranch managers in charge of agricultural operations. Timber harvesting often adds to farm income.

Clinton-Turah

A significant amount of prime farmland exists in the Clark Fork River valley from Turah east. Much of this land has been subdivided into small homesites and 20-40 acre rural residential homesteads which are being used to raise cattle and horses. Some traditional cow-calf agriculture takes place along the Clark Fork east of Rock Creek and Rock Creek, Schwartz Creek, and other lateral drainages. Public and corporate lands in the Garnet and Sapphire mountains provide summer woodland grazing on which the larger operators rely. The Clark Fork River floodplain provides pasture, hayland, and cover for livestock.

Evaro

Cow-calf pairs are raised in the Jocko Valley and supported by irrigated hay and pasture. Ownerships are generally small. An eight square mile expanse of prime farmland is located north of Evaro at the county line. Pigs are presently raised north of Evaro. Conflicts with grizzly bears occur.

Missoula Valley

This densely settled region contains a complex mosaic of rural residential areas, urban and built-up land, and agricultural land. Most farms and ranches raise cow-calf pairs and grow irrigated hay crops. Most pasture and hay is provided on-farm in most years. Grain is grown by many operators either in rotation with hay or as a cash crop. Small grains are traditionally grown on the old lake terrace on which Johnson-Bell Field is located. Grain crops are also raised on the foothills north of I-90. The floodplains of the Clark Fork and Bitteroot rivers serve as hayland, pasture, and calving or cover areas for livestock. Summer pasture is leased from corporations and public agencies west of Big Flat. Ranchers truck cattle from outside the valley to graze on leased pasture in the mountains surrounding Deer Creek. A dairy farm exists west of Target Range. Land subdivision and residential, commerical, and industrial developments have occurred on substantial amounts of former farmland. The Missoula urban area extends from Mount Sentinel to Kelly Island. Grass Valley, Grant Creek, and Miller Creek are experiencing considerable residential development. A large amount of prime farmland occurs just west of Reserve Street, at Grass Valley, along Miller Creek, and up Grant and Butler creeks. Farmland of statewide importance is common on the airport terrace. Locally important farmland is intermingled in the main valley, in the foothills north of I-90, and south of Buckhouse Bridge in the South Hills. Horse and cattle raising on hobby farms is common throughout the region.

Lolo

Several of the largest ranches in the county exist in the Bitterroot Valley. These ranches primarily raise cow-calf pairs and sheep. Irrigated hay fields and pastures occur on benchlands. The Bitterroot riparian zone is used as pasture and for calving areas. Coyote predation occurs during lambing season. Irrigated and dryland grain crops are grown on some benches. Locally important farmland occurs west of Highway 93 and on eastside basin-fill benches. Scattered pockets of prime farmland also exist in these same areas. Westside benches provide cropland, pasture, and rangeland adjacent to the valley

bottom. The Lolo area has grown tremendously in population during the last decade. Visually, the agricultural landscape persists, yet subdivision and residential development is increasing, primarily west of Highway 93. The narrow Lolo Creek valley is experiencing substantial subdivision and residential development. A great deal of the valley bottom is prime farmland. Cow-calf ranches and smaller rural residential homesteads exist along Highway 12. Irrigated hay and pasture parallels Lolo Creek. Summer pasture is leased in the surrounding mountains. A mink farm exists in this area.

Frenchtown-Huson

This rural region is still strongly oriented to agriculture. Several working farms and ranches remain. Most operations are integrated cow-calf cattle ranches with hay and grain crops grown on irrigated fields in the valley bottom. The Clark Fork River bottomland, although not containing highly productive soils, is critical for hay base, pasture, and calving. Summer pasture is leased in the nearby mountains. A dairy farm is located in the region. Prime farmland exists in the Frenchtown and Huson areas. Subdivision activity is primarily located along I-90 at Frenchtown and in Sixmile and Mill creeks.

Ninemile

The narrow band of private land along Ninemile Creek contains a complex pattern of residential and agricultural uses. The most common agricultural use is a cow-calf operation with hay base and leased summer pasture. Larger ranches exist in the upper portion of the drainage basin. Mining claims are worked adjacent to several ranches. Timber harvesting supplements farm and ranch income. As in the rest of Missoula County, non-farm income provides major support to many families engaged in agriculture.

Four conclusions are readily apparent from analysis of conservation resources in Missoula County. First, the variety and quality of resources is impressive. Second, the distribution of resources is extensive. Third, conservation resources tend to aggregate in certain areas. Fourth, conservation of many resources is closely integrated with maintenance of floodplains, riparian corridors, and lands in agricultural use.

The conservation resources of Missoula County are distributed in a pattern which can be described as "rooms and corridors." "Rooms" are broad clusters of concentrated resources. "Corridors" are lineal features such as waterways and roads which connect these clusters and other portions of the county.

The largest "room" in the county is Missoula Valley, itself a cluster of smaller rooms and corridors. The combination of open space, recreation opportunities, historic areas, and key wildlife habitat creates a complex mosaic of conservation qualities. Also contained in Missoula Valley is the largest expanse of prime and important agricultural soils and irrigated and irrigable agricultural land in the county. Subdivision activity, too, is an intrinsic component of the land use pattern.

"Corridors" of conservation values parallel major waterways and roads. Waterways contain a dense assemblage of important conservation attributes. Riparian corridors are the principal focus of active recreational use, as well as passive enjoyment of open space. Public purposes of protecting water quality and supply, flood control, and controlling erosion are met primarily in these areas. Critical habitats for a diverse array of creatures including fish, waterfowl, raptors, and big game are unalterably linked with wetland ecosystems. Roadway corridors offer primary visual access to county landscapes. In many cases, these passageways overlap with adjacent waterways to create a further aggregation of important conservation qualities. Therefore, it is near water that open space, ecological, and recreation resources tend to converge and coalesce to form unique and sensitive terrain prized by county residents.

Composite Values map (Map 12) has been prepared by combining key conservation resources from preceding sections. This map displays the location and pattern of areas of concentrated conservation value in the county. The non-agricultural categories of significant conservation value have been combined as one feature on the map. Unsubdivided farmland of prime or statewide importance is shown separately as a dot pattern. Lands where change is occurring due to urban development, residential subdivision, and related development are indicated by crosshatched line pattern. Sites of scenic, recreation, historic, or ecologic significance are indicated by a solid triangle.

The combined area of concentrated resource patterns covers about 20% of the county. Within this total, lands which contain three categories of conservation values (typically recreational, open space, and ecological) are found near rivers, creeks, and lakes, as well as on a few upland sites near Missoula. These areas form the foundation for maintaining the integrity of the total landscape. However, only about 5%, 80,000 acres, of the county is classified in this category. Sites which contain two categories of conservation resources typically include recreation areas which are also visually accessible to the public or have ecological importance. Except for critical grizzly bear habitat which occurs primarily on public lands, areas with two categories of conservation resources also comprise less than 5% of the county landscape. Lands with one category of conservation resources are generally big game winter range habitats located on benches and lower mountain slopes. Exclusive of wilderness and national recreation areas, lands with one resource category comprise about 10% of Missoula County. As the combined resource patterns are primarily confined to valley bottom corridors, private, non-corporate ownership is predominant. Upland sites are in a mixture of public, corporate, and non-corporate private ownership.

Areas which contain the same number of categories do not necessarily have the same importance. Map 12 does not show which specific conservation categories are present, nor does it reveal high or low concentrations of specific features (such as number of big game in a winter range). Map 12 does not prioritize areas. Reference should be made to the preceding sections in this report for clarification and comparison of individual areas and their resources. The Composite Values map reveals where conservation resources are concentrated. Other areas are not necessarily unimportant, but further research will be necessary to determine the existence of significant conservation resources.

Subdivision and Conservation Values

Significant conservation resources on private lands have survived a history of agriculturally related land uses. Some of these values have been displaced by urban development. Subdivision patterns tend to indicate the direction of future urban and suburban development. Therefore, comparison of major resource patterns of areas exhibiting subdivision activity indicate potential for future displacement of these resources and traditional forms of forest and agricultural land use.

The majority of farmland rated by the SCS as prime or of statewide importance occurs in the Missoula Valley, Frenchtown-Huson, and Evaro regions. Pockets of "important farmland" also occur in the Lolo, Clinton-Turah, and Ninemile regions. The total area of this type of farmland is estimated to be 36,000 acres. Of this total, about 6,800 acres have been intensively developed in urban uses. Approximately 11,700 acres,

MAP 12

COMPOSITE RESOURCES

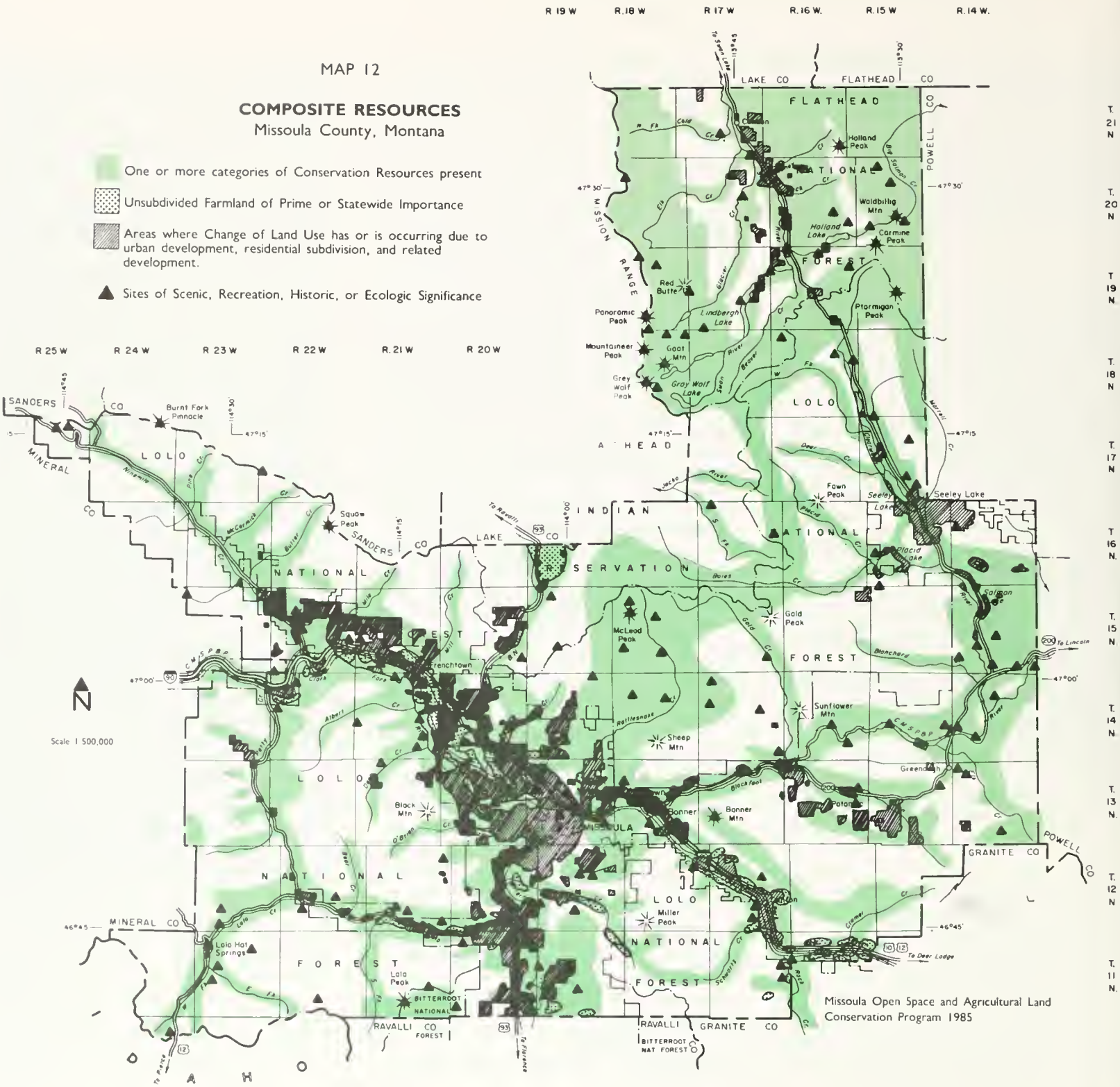
Missoula County, Montana

One or more categories of Conservation Resources present

Unsubdivided Farmland of Prime or Statewide Importance

Areas where Change of Land Use has or is occurring due to urban development, residential subdivision, and related development.

▲ Sites of Scenic, Recreation, Historic, or Ecologic Significance



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or more than one-third of the remaining important farmland, is experiencing subdivision activity. Areas of important farmland are relatively modest in size when compared to combined resource patterns. However, these lands provide basic support to traditional agricultural land use, and individual properties tend to include important farmland as well as conservation resource lands.

About 77,000 acres of land has been subdivided outside prime agricultural and existing urban lands. Subdivision activity in the county is most pronounced in Missoula Valley, Lolo, Frenchtown-Huson, and Clinton-Turah areas. Locations within a short commute of the city which still possess rural characteristics appear to be preferred. Growing popularity of rural residential "hobby farms" is the land use trend which typifies the style of development in many areas outside the city. Due to ease of development, access, health regulations, availability of services, and the desire to maintain horses and other livestock, valley bottoms and gently sloping benches are experiencing greatest development pressure. Steeper foothills are being developed where year-round access roads and utility lines already exist. These upland areas are often big game winter range. Recreation-oriented residential subdivisions occur in river corridors throughout the county but are most extensive along the Clark Fork upstream and downstream of Missoula and in the Seeley-Swan region.

Conclusion

Virtually all private lands in the county contain conservation resources. However, a relatively limited area contains conservation resources of significance to the general public. The existence of any pattern of conservation resources shown on maps contained in this report is not meant as a recommendation that no development occur. While development within fragile ecosystems or floodplains may have severe impacts, some building is possible in most areas. The style, density, and precise location of improvements are the critical variables. Astute development designs can assure long-term maintenance of many of the county's most desirable conservation resources.

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